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Dark Green.

THE JOURNAL OF SOUTH AFRICAN BOTANY.

Volume VII, 1941.

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On page 61, line 3, for *these* read *there.*

On page 74, line 21, for *De Garcia-Pass en William John Burchell* read *De Garcia-pas en W. J. Burchell.*

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JOURNAL

OF

SOUTH AFRICAN BOTANY

VOL. VII.

WILLIAM JOHN BURCHELL, BOTANIST.

By Helen M. McKay.

Introduction.

After the departure of Thunberg from the Cape of Good Hope in 1775, the country was visited by several collectors and some dilettante botanists. Many of them were worthy and interesting men, and in the early days of the 19th century, there arrived one who has been spoken of as "the most painstaking and accurate of botanical travellers,"* William John Burchell.

Though he possessed ultimately a herbarium of considerable size, he was not a mere collector, but rather an individualist, attaching himself to no particular "school" but carrying on careful scientific observations and recording them by means of notes and drawings made in the field and not in the museum. He worked in the period before the microscope and laboratory gave an intensive value to botany as a science.

He was a naturalist, observing Nature in many of her aspects, but it is his activity in the Botanical field which will now be considered, and this work falls easily into four divisions dealing :—firstly, with his youth and sojourn in St. Helena : secondly, with his South African journey : thirdly, with his Brazilian period : and fourthly, with the European period and his contact with other Botanists.

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* MacOwan : *President's address S.A. Phil. Soc., Trans.* 1866, Vol. 4, p. xlii, 1884-88.

ACKNOWLEDGMENTS.

Before proceeding further, I wish to record my thanks to all who have given me very valuable help and guidance while I have been pursuing my research.

Sir Edward B. Poulton and Professor G. D. Hale Carpenter of the Hope Department of Zoology (Entomology), Oxford, kindly arranged for me to have access to the Burchell MSS. now lying in the University Museum, Oxford.

Thanks are due to Sir Arthur Hill, Director of the Royal Botanic Gardens, and Mr. A. D. Cotton and his staff, at the Herbarium and Library, for permission to consult the various Burchell MSS. at Kew; to Mr. Spencer Savage, Librarian of the Linnean Society of London, and Mr. Warren R. Dawson for help in my search for Burchell correspondence.

In South Africa, I have been encouraged in my work by the kindness extended to me by Dr. Pole Evans and Dr. E. P. Phillips of the Division of Plant Industry, Pretoria, and by Mrs. Bolus, University of Cape Town.

I have to thank the Gubbins Trustees; also Mr. H. R. Raikes and Mr. P. Freer, the Principal and Librarian respectively of the University of the Witwatersrand for permission to handle the Burchell drawings.

To Mrs. Hutching, Cataloguer of the Gubbins Collection of Africana at the University of the Witwatersrand, and to Miss Gunn, Librarian, Division of Plant Industry, Pretoria, I am indebted for bearing with me when in search of books of reference.

PART I: BURCHELL IN ST. HELENA.

William John Burchell, born in 1781, was the eldest son of Matthew Burchell, who owned the Fulham Nursery, near London.

From Faulkner's *History of Fulham* published in 1813, we learn that the Fulham Nursery and Botanic Gardens had been established in the time of George I, and came into the hands of William Burchell and his nephew Matthew, in the reign of George III. The ground, about nine and a half acres in extent, was adjacent to the gardens of the Palace of the Bishop of London.

Among the botanists and travellers who had enriched the Nursery were Mark Catesby (1), Peter Collinson (2) and Philip Miller, (3) and Bishop Compton's (4) collection at Fulham Palace is said to have been sold to it. It would thus appear to have been a place of good standing and reputation.

Young Burchell grew up surrounded by things of beauty: in the

Nursery he beheld some of the most exquisite of exotic flowers, and in his home, judging from the list of its contents sold in 1865, he had every opportunity for cultivating and appreciating the fine arts.

He was educated at a boarding school at Mitcham, and his response to the environment of his childhood can be understood from the following letter written to his father about two months before his fourteenth birthday.

> " The Latin usher that came last, seems to express a wish to teach me botany. I should not have known that he understood that science had not I taken it into my head to find in what class the flower of the May tree was : he explained it all to me very clearly. He asked me if I had any books that would do to begin by. I told him there were some at home : he desired me to send for them, therefore will you send or bring me that book with the coloured plates in it, there are two of them. If you have " Linnaeus's System of Botany", I had much rather have it than the others :
>
> But be sure you send one of them.
>
> Mitcham,
> May 20, 1795."

Botany was not then on the programme of school subjects, so that usher, unnamed, deserves a word of appreciation from botanists for having encouraged young Burchell's study.

Except for drawings made during his school days, there is no further account of his botanical studies until 1801. In his *Memoranda Botanica MSS. I*, under the heading of *Ephemeris Botanica*, are found thirty-four entries all of which are descriptions in Latin of exotic plants. These notes were written between 1801-05 at the Kew gardens and elsewhere.

In the records of the Linnean Society of London is the following entry :—

> " Mr. Wm. J. Burchell of Fulham well versed in the science of Botany being desirous of having the honour of becoming a Fellow of the Linnean Society, we from our personal knowledge recommend him as likely to become a useful and valuable member.
>
> (Sgd.) A. B. Lambert(5)
> Charles Koenig(6)
> R. A. Salisbury(7)
> W. G. Maton(8)
> Dec. 7 1802."

He was proposed in December 1802, and duly elected on 15th February, 1803. Burchell, William Hooker and Lindley were all very young men when they became Fellows of the Linnean Society of London.

In 1804 Burchell went to Wales on a holiday. Drawings done during the trip, none of which are botanical, are now in the Gubbins Trust Collection, but there is no trace of the Journal which he kept and of which he speaks in later years. Only copies, made by one of his sisters, of two letters written at this time are extant, and from one, written to his Father from Llanelly and dated Sept. 18th, 1804, we gather that Matthew Burchell must have been advertising for an assistant or a partner in the Fulham Nursery business, for we read :—

> "The applications which you have received are from persons certainly better fitted to assist you than myself, for you must know that I possess a nature which could it be changed for one more suited to my station, would be happier for my family, and in all probability for myself. I will not therefore deceive you by suffering you to suppose that by my having greater advantages from greater exertions I could probably be of more service to you than I have been. You cannot know me if you think that interested motives have any place in my thoughts. Why then do you suppose that my actions and conduct will take a different turn from the offer of emolument.
>
> If you will be content to accept of my services guided by the same well meant intentions as they have always been (notwithstanding they have and maybe, less efficient than you wish), I offer them unconditionally, for to claim a share in those profits to which you only are entitled, and ought fully to enjoy, would be quite repugnant to my feelings. That which is sufficient, I have always had, and more than that I have not earned."

This letter shows the young man's independent spirit and desire for travel and research, but the last sentence is not quite clear as to whether he meant that he was in employment of some kind, or had a private income.

On 7th August, 1805, Burchell sailed for St. Helena. A deed of partnership had been drawn up between William Balcombe, (9) Essex Street, Strand, and William John Burchell of Middlesex, who were to reside in St. Helena and carry on business as merchants.

On the outward voyage Burchell made an excursion up the mountains near Funchal, Madeira. His notes about specimens collected then are in his *Memoranda Botanica* MSS. I, section II which also contains memoranda relating to Portugal, Madeira, Teneriffe and Brazil, all of which he visited in 1825.

One entry is of interest :—

"626. *Chenopodium Ambrosioides.*

1 Hab. in aquosis.

This specimen is the parent of all the plants that now abound in

> the island of St. Helena : for on landing there and perceiving a few seeds in the paper which contained this specimen, I carefully sowed them in a garden up the Valley above the Town where three plants grew up and plentifully produced seed which being scattered around, and many growing up the side of the *Run* of water, and thriving luxuriantly, their seeds were washed down into the foss of the Fortified lines, where, and in many other places, I saw in 1815 on my return from the Cape to England this species of plant flourishing in the greatest abundancy being a situation similar to that in which I had originally found it at Madeira, and now therefore become a native wild plant belonging to the Flora Heleniana."

It might be asked whether he was in a serious mood when he wrote these last few words or was critical of the tendency of the time to become very excited over the discovery of specimens of supposedly indigenous plants.

When Sir Joseph Banks (10) visited St. Helena in 1771, he wrote : –

> " Secluded as this rock is from the rest of the world by seas of immense extent, it is difficult to imagine how anything not originally created in that spot could by any accident arrive at it."

He did not foresee seeds arriving in packets of collectors' specimens !

In Roxburgh's (11) List of Plants seen growing on the Island of St. Helena in 1813-14, appears *Chenopodium ambrosioides* Linn. Mexican Chenopodium.*

In Melliss (12) there is the following note : " Well known by the name of Tantocury. A most abundant weed in gardens, along roadsides etc. Wild and very common at all altitudes. Hab. Cape of Good Hope."

Burchell's little bit of mischief did not influence Roxburgh or Melliss : they duly marked the plant as an exotic, but Melliss thought its habitat was the Cape of Good Hope. It may have been found there, too, but it would appear that, though Melliss had access to Burchell's material at Kew, he had confined his attention to the Flora Heleniana and missed the book containing the note of confession about the seeds.

" William Burchell, Midshipman "—such was his rating in the " Northumberland," one of the East India Company's merchant ships arrived at St. Helena in December, 1805, and started work as a merchant in the firm of Balcombe and Burchell.

In March, 1806, he was among the party which escorted Dr. Lichtenstein(13) over the Island.

In June, 1806, he wrote to his Father that he was sick owing to the anxiety and fatigue of managing the business, and that he contemplated dissolving the partnership. In three months' time he held the post of Schoolmaster in a temporary capacity.

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* *Chenopodium ambrosioides*, Linn. Melliss, J. C., *St. Helena*, p. 314, 1875.

On his way to India in 1802 George Annesley, Viscount Valentia, called at St. Helena and, though only an amateur botanist, he was struck with the mixture of vegetation on the Island " where the oak and the bamboo jostle each other."* He spent some time with the Governor and found there was a botanist appointed by the India Company to look after the public gardens situated behind the Castle, but no attempt had been made to collect indigenous plants. His visit must have stimulated Governor Patton's (^{14}) desire to effect improvements. When Burchell came along the Governor, being favourably disposed towards the young man, recommended to the Court of Directors of the East India Company that he be appointed as manager and superintendent of a new garden situated in the Jamestown Valley and which was to be known as the Botanic Garden.

The post to be created was quite distinct from that held by the official, Mr. Porteus, who was attached to the Castle and Plantation House, the Governor's residence and whose duty it was to keep the Meteorological Journal and present agricultural reports. Burchell was to be appointed as Naturalist to the Company.

The letter from St. Helena written by Governor Patton, " hoping for the approbation of the Honourable Court in favour of the modest and unassuming merits of Mr. Burchell " was dated 31st January, 1807 and crossed in mid-ocean a communication confirming his appointment as Schoolmaster, the post which he had held provisionally from September, 1806.

He was now Schoolmaster and acting provisionally as naturalist. On 31st March, 1807, he did his first planting in the Botanic Garden, and on the 7th April, 1807, he records in his diary his joy when visiting the new garden during " the delightful dewy freshness of the morning". On Sunday, 19th April, is the following entry :—

> Before I was up the Governor sent to see me at the Castle. When I went down, he told me that Mr. Drummond of Canton had brought some plants with him intended for the Kew Garden and that he (Gov.) had mentioned our Botanic establishment here and proposed for some to be left at St. Helena. The Governor introduced me to Mr. Drummond who offered to send his plants on shore ; I proposed for us all to walk up to the Botanic garden. I explained my plan in laying it out and Mr. Drummond offered some seeds. They all seemed pleased at the prospect of establishing a Botanic garden

---

* Valentia, George Annesley, *Viscount : Voyages and Travels*, Vol. 1, p. 14, 1809.

> and Mr. Drummond seemed very desirous of promoting it by every means in his power, and said he would write to Mr. Roberts his successor at Canton and Mr. Kerr the gardener at Macaw and to Mr. Duncan at Pinang. We returned to the Castle and after taking some wine, rode to Plantation house where we dined. Mr. Brooke(15) told me (as a secret) of his having collected the materials for a History of St. Helena and was very desirous that I should publish the natural history of it at the same time".

The above extract is given in full, for it establishes the fact that to General Patton was due the credit of establishing a Botanic garden, apart from a Public one, and to Burchell for beginning to stock it.

Before Mr. Drummond left, they agreed to land the David Scott's Plant cabin and "exchange the healthiest plants I had on shore for the sickly ones in the *Walmer Castle*, and get on shore the Kew seeds and take a part. He [Drummond] seemed very desirous of promoting my Botanical establishment and I felt much satisfaction for his behaviour to me".

Brooke's book was duly published, but so far as can be ascertained the natural history part did not materialise. Only a few pages are devoted to general remarks about a few plants, fish and the geology of the Island, but these notes may have been supplied by Burchell.

Burchell was happy but for only a few months. General Patton was recalled and in May, 1807, Lieut.-Colonel Lane was appointed Acting-Governor. He visited the Botanic garden in July and signified his intention of altering entirely all plans and arrangements : he was determined to grow vines in it. Burchell writes :—

> "I had just been making a trellis for the different twining exotic plants that I had collected and reared : this he said would just do for him to plant vines against, and it appears that he is resolved to undo what the good and excellent Governor Patton strove to accomplish."

The young man was sorely dismayed. His diary gives us a record of events :—

> "12th Wednesday August 1807. At ½ past 11 I received by the orderly a message from Col. Lane for me to meet him at the Botanic garden. We had much conversation therein. I refused to agree to his plan of destroying the Garden by making it into a vineyard, leaving the plants to shift for themselves between the vines. I parted with him under a threat that " he would not forget me".

Holes were dug and in due course vines were planted. This discouraged Burchell but he had some one to whom he could confide his troubles, for Dr. Campbell, botanist from Sumatra, arrived at St. Helena.

In his diary Burchell writes :—

"15. Saturday August 1807. This morning Dr. Campbell was introduced to me : I found him a man of much information, and a *scientific* botanist : he told me of his great success in spice plantations at Sumatra which had so superseded the growing of pepper, that the latter was now being neglected. He walked home with me to see some of my botanical books, returned and show'd me some beautiful and valuable drawings of plants : spoke with rapture of the botanical riches of Sumatra and of which he was preparing a large work."

"19th August. Dr. Campbell, who had intended to remain here for a few months on account of his health, having taken a dislike to the place, determined upon returning to India by the *Hawkesbury*. The address he gave me was 'Chas. Campbell, Senior Surgeon, Fort-Marlbro' ".

"I wrote to Dr. Roxburgh informing him of Col. Lane's conduct with regard to the Botanic garden. This letter I gave to Mr. Blanchard purser of the *Hawkesbury* who promised when on board to give it to Dr. Campbell who was a particular friend of Dr. Roxburgh."

The following letter shows that the young man had benefited from Dr. Campbell's visit :—

"Island of St. Helena,
24th August, 1807.

Sir,

The accompanying eleven drawings and the enclosed letter were put into my hands by Dr. Campbell who requested me to forward them to you. During his short stay at this place I have felt much pleasure in his acquaintance and doubt not that you will find as much in his correspondence.

From what he has told me I feel persuaded, that a knowledge of the productions of Sumatra must be extremely interesting to the Botanists of Europe, and am inclined to believe that they will not be disappointed in the communications of Dr. Campbell.

Having suddenly resolved upon taking his passage to India, the hurry and immediate sailing of the ship prevented his finding the description of *Marsdenia* to which he has alluded in his letter.

From the expectation which I have of receiving from him the seeds of Sumatra, I venture to hope, (if the East India Company confirm the establishment of a Botanic garden here) that many of them will be naturalized to this island, and thus their ultimately arriving in England will be rendered more certain than if they were carried directly from their native country.

If, from my residence in this part of the world, I could fortunately make myself a useful member of the Linnean Society, I shall esteem it the greatest honor to receive your commands, and am

Sir,
Your most obedient and humble servant
(sgd) Wm. J. Burchell.

To Dr. James Ed. Smith,
President
of the Linnean Society, London".

Meanwhile in the Botanic garden the vines continued to play havoc with the young exotic plants. Burchell however continued collecting, sketching and making notes for his Flora Heleniana. He noted that in the garden at Longwood the coffee trees were laden with berries and he was convinced that a coffee plantation would be lucrative. In his diary for October, 1807, he makes several entries about the beauty of the vegetation on Diana's Peak, the highest point in the Island, about 2,700 feet above sea level. Regarding the *Dicksonia** he writes :—

> " I gazed with delightful surprise on this very remarkable production : I scarcely dared to believe that it could be really a fern. Its robust stem or rather trunk and its height which sometimes equalled twenty feet forbade my considering it as belonging to a tribe, which, instead of overtopping the surrounding trees, is rather contented to rise a little above the grass. Not only does it spread its gigantic leaves over the tops of its neighbours, but it even presumes to assume the form of the towering cocoa-nut. The leaves which spread out horizontally from the top are frequently six feet long and give it exactly the character of the lofty palms. But when you approach and examine its fronds you are surprised to find only the fructification of a humble fern. Its trunk is most frequently clothed with small ferns and mosses : and amongst these, little parasites.
>
> I found an old English acquaintance which I never dreamed of seeing here : this was the elegant little *Trichomanes tunbridgense*. Here we see the interesting whimsicality of Nature in thus so closely associating one of the smallest with certainly the largest fern known to exist."

In 1875 Melliss writes of the *Dicksonia :*

> " Its upright stem varies from six to eight inches in diameter and from four to ten feet in height, more or less covered with long bright

---

* *Dicksonia arborescens* L'Herit. or *Balantium arborescens*, Hook. & Benth. Syn. Fil., p. 50. Plate 54. 1868.

> golden-brown hair, intermixed with parasitical plants, and topped with a splendid crown of bright green fronds, much resembling a miniature palm-tree : it is exceedingly picturesque amongst the other Ferns and native vegetation. Dr. Roxburgh described in 1813 the size of this fern as being twenty feet or more in height and of various thicknesses up to that of a man's body, with fronds (including the stipes) from four to ten feet long. As it does not now—1875—attain that size, it may be considered that like other indigenous plants it is degenerating and gradually dying out."

Some are still growing [1940] on Diana's Peak and radiating their beauty despite the damage done by goats to the surrounding vegetation.

Of other plants on the Peak, Burchell writes :—

> " The appearance of a tree, hitherto unobserved, caught my eye, and from its almost inaccessible situation, I, with difficulty succeeded in obtaining a branch. I guessed it a species of *Phylica*, but the leaves were remarkably large for that Genus. (I have afterwards found that it is called by the natives the olive tree : it *is* a *Phylica*.)"*

In October, 1807, he sent off " a small box of mould containing three capsules of Barringtonia for Kew Gardens, together with instructions for the management of it." These seeds were from the tree planted by Captain Cook on his return in 1774 from his second voyage. Cook's Botanist Forster(16) named it Barringtonia *speciosa*† in honour of Dr. Barrington(17).

An entry in Burchell's diary, dated November, 1807, is :—

> " Barnes(18) sent me a specimen of the Boxwood shrub of which I directly made a drawing : it being a great botanical novelty and a curious plant."

He became enthusiastic about this shrub with its pretty white blossoms placed under the leaves so that they were scarcely visible until the foliage was lifted.

In the album of his drawings now in the Library of the Herbarium, Royal Botanic Gardens, Kew, there are several sketches of this plant and all of them are pencil drawings giving botanical details. The boxwood was *Physalis begonifolia*, Roxb. now *Mellissia begonifolia*, Hk. f. and was extremely rare when Melliss wrote in 1875.

He accompanied Captain Barnes on many occasions. These were happy times, for Barnes had many anecdotes to relate ; their food supply was generous, judging from what they carried on one occasion :—" a piece of salt beef : a tongue : a roasted fowl : bottle of Port wine : bottle of Hock : cheese and a tin box (green) to hold plants." It is interesting to note that though Burchell did not produce a book on the Natural History of St. Helena, Barnes did, in 1817, publish a small book which contained Roxburgh's list of plants, indigenous and exotic, found on the Island. To this list were added some things omitted by Roxburgh but which Barnes had observed. It might be presumed he had benefited from Burchell's botanical observation.

---

* *Nesiota elliptica* Hook. f. : *Phylica elliptica* Roxb.

† *Barringtonia speciosa* Willd. : *B. racemosa* Roxb.

In November, 1807, Burchell was looking forward to the arrival of his fiancée, and because of his disappointment over his schemes for the running of the Botanic garden, he contemplated settling on Tristan d'Acunha. A few entries in his diary tell of the accounts given to him by sailors, of the islands in and around Tristan being " covered with trees and verdure down to the water's edge."

His dream of a paradise was shattered, for his young lady during her voyage to St. Helena had transferred her affections to the Captain of the ship, and Burchell was left to pursue his path alone. Though he accompanied Captain Barnes when the latter was surveying the Island, Burchell several times went by himself to Diana's Peak on botanical excursions, for he found that companions and refreshments impeded his pursuits on such occasions. He revelled in the wealth of growth on the Peak, saw the tea shrub ; Lobelias eight feet high, and the Dicksonias ! Among them he did some thinking :—

> " 14 January 1808. I think Hedwig(19) well deserved the honour [referring no doubt to Hedwig having been named " Father of the Cryptogames "] though his name has been given to another Genus. The name of a naturalist should only be given to a genus analagous to those amongst which he most laboured—thus Dillenius(20) a moss, Scheuchzer(21) a grass, Thunberg(22) a Japanese or Cape Plant, Sloane(23) a Jamaica plant, Catesby(1), a Carolina Plant, Persoon(24) a fungus : Esper(25) a Fucus, etc, and we see that the venerated name Linnaeus is with peculiar felicity applied to a Lapland plant which thrives even under the snow for so did his genius first adorn the snowy part of Europe. The Flora Lapponica is one of his best works."

On 28th January, 1808, he enters in his diary :—

> " I received a letter from the Revd. Mr. Hesse(26) at the Cape, dated 8th January together with a parcel of 150 sorts of seeds, mostly of bulbous plants. This letter pleased me much as it was written in the liberal style of a man of science and refinement. It was in answer to mine of 17th Nov. last."

Later, is another record of mischief making :—

> "4th Feb. 1808. In my walk to the Garden I took some seeds of *Xanthium orientale* in my hand, and scattered them as I walked and have no doubt that it will on some future day be reckoned an indigenous St. Helena weed." His conceit of such a happening has not been fulfilled !

A month after receiving seeds from Cape Town, came a basket of succulent plants, 67 species, from Mr. Hesse. About the same time Burchell remarks that he found a Chinese species of Amaranthus had a taste of spinach : that *purslane* when boiled gives a good spinach otherwise a very excellent salad, and that he had been given two of the curious Chinese flat peaches and that he had made a drawing of them —No. 625.

In May, 1808, he gathered the first cotton ever grown at St. Helena, and received from Dr. Roxburgh a parcel of 130 sorts of seeds, and prepared plants to be sent to Kew. A few months later there was landed a box of plants from China but, when he went to the Garden to compare what he had received, he

> "found that they had been changed ! for instead of two boxes directed for me I only received one directed, and not one of the plants corresponded with my list and even those were all dead : they appeared as if they had never had a drop of water all the voyage."

He was not discouraged, for shortly after this he despatched plants to Dr. Roxburgh, and at the request of the new Governor—General Beatson(27) who arrived in July, 1808—comments on *Salsola Indica*—samphire.

> "The Governor was going to make the experiment whether it would not produce Barilla and I answered that every maritime plant containing a salt taste would always yield it ; had some Salsola collected and built a furnace for obtaining Barilla from it."

By this time Burchell was named the East India Company's Naturalist, but the salary attached to the post was to be left to the Company's generosity. He resented this, but after a wordy struggle with the Governor, he accepted the appointment at £250 per annum and was led to believe he would be given a house and some land on which to carry out experiments in the country.

He seemed to be happier and says so in a letter written to Tilesius(28) at Leipzig. He hoped to enjoy his work in the Botanic Garden. It may be of interest to state here that when Tilesius met Burchell on St. Helena he presented the young man with his own copy of Esper's illustrated work on "Die Tange—Fuci". This book with Burchell's name and inscription in his own handwriting, "Ab Amico Doctor Tilesius ad Ino. St. Helena dono datus", is now in the Library of the University of the Witwatersrand.

Governor Beatson had decided to carry out agricultural improvements on the Island. It may be that he looked at things from a wider utilitarian point of view than did Burchell, but certainly from now till 1810, there were several occasions when differences of opinions seemed to offend the sensitive young man. It was a case of an outlook from an economic viewpoint, clashing with that from a scientific botanical one.

Burchell had carefully reared his cotton seed but Beatson's agriculturalist, Porteous, had been able to raise only a few plants from the seed sent. The Naturalist becomes depressed, and once more thinks of Tristan d'Acunha and talks with all the whaler Captains who have seen the Island.

On his way to England, the Chief Judge of Ceylon, Mr. Johnson, called at St. Helena, and on Burchell speaking of his dissatisfaction because of lack of encouragement, the Judge said that Ceylon's Governor would welcome such a botanist as Burchell and offer him every assistance to carry on research. Ceylon, being a King's settlement, would offer more liberal emolument than the East India Company and Burchell was urged to go there.

In the meantime the Barilla experiment proved successful and he writes :—

> " . . . therefore everything is Barilla now and the Governor sent me a message that he wished to consult me on the method of burning it."

In June, 1809, his appointment as Naturalist was confirmed from London and his salary was now increased to £300 per annum on condition that he relinquished his post as Schoolmaster. The Governor told him that his duty as Naturalist was of such a general nature, it would be left to his own discretion as to how he should work. This was too vague for him and he became restless.

The retired Auditor-General, Mr. Tolfrey—from Ceylon, visited him. They had interests in common, botany, music and painting, and refreshing as his visit was to Burchell, it left behind it a young man now the possessor of a copy of *Flora Japonica*, but alas, also of a burning urge to get away from the Island, to Ceylon, to anywhere.

The next interesting visitor he had, was an oriental scholar named Ralph who accompanied a Persian *Münshee* (Secretary or Teacher) on his way to England to study English and become a professor of Persian at one of the Colleges. Burchell now dreams that one day his feet may touch the soil of Persia, and therefore begins some " Persian studies".

Again he becomes mischievous : and under the date 31st July, 1809, we read :—

> " In many places I sowed the seeds of various exotics and carefully protected these *wild* gardens with stones, and left them to the chance of nature. At some future day these plants may spread themselves over the neighbouring hills and be mistaken indigenous".

Well, the young man was wrong ; when found they were not labelled indigenous !

A whaler Captain tells him more alluring tales about Tristan, but, meantime, he has to consider the drawing up of his first report as Naturalist. During one of his excursions he collected lichens and made a drawing of the Redwood tree. This drawing differs from that made two years previously, for it gives full details of the flower and on it is a note, " underlined parts in common with dwarf ebony". This sketch is at Kew.

His report consisted of twenty-five pages foolscap, and it led to his resigning his post, though the trouble over it did not arise until fully six months after the writing of it.

Meanwhile he was encouraged in his *Wanderlust.*

> " 17th Oct. 1809. After breakfast went on board the Princess Charlotte to see the drawings of Captain Tobin. Portfolio full : some of them were of Otaheite where he had been with Bligh and brought the bread fruit tree to the West Indies and touched at St. Helena where he [Bligh] left some plants (about 14 years ago)."

A letter came from Mr. Hesse at Cape Town. There is no trace of its contents, but it must have been of some importance, for Burchell begins in November, 1809, " to prepare my Flora Heleniana by making a catalogue of the plants of this island", and a month later he is busy making drawings for illustrating his catalogue.

In January, 1810, he says : " Arranged my herbarium according to the System of my Flora Heleniana", and again on 25th January,

> " I am giving all my attention to complete the materials for my Flora. I feel myself (as it were involuntarily) preparing for my departure." On 27th January : " I received a letter from Mr. Hesse dated 10th January this year, in which he said that Lord Caledon —Governor of the Cape of Good Hope—was desirous to know if I would accept of the situation of ' Botanist to the Cape Colony' ".

There is no trace of his reply to this.

He was given

> " a cartload of the leaves of the Spanish aloe to make hemp of. But they were very bad and few of them fit for the purpose. I had them first bruised with a mallet and then thrown into the pond."

He was restive and irritated and a month later he writes :—

> " In conversation I told him (Secretary) that as the Governor had not thought proper to employ me in any useful service, I was resolved not to receive [accept] any more salary till he *did.* I argued that he [Governor] had left me in the lurch and that I was now so completely disgusted with St. Helena that I did not believe I should ever receive [accept] any more of the Company's money."

He was very independent ; his living cost him £500 per annum : his salary was £300 and he was refusing to accept even that amount !

Burchell was now determined to leave St. Helena, and on 10th April, 1810, he wrote to Mr. Hesse that he had resigned and was now busying himself with preparing his herbarium to send home ; and in June, when answering a letter from Mr. Hesse, he said that he was certainly coming to the Cape as soon as the *Cirencester* arrived.

The *Camperdown* sailed for Rio de Janeiro from St. Helena on the 12th July, 1810, and Burchell remarks that he was very vexed that he was not ready to take his passage in her. The *Cirencester* arrived but he found himself unable to sail, for his business affairs were not in order and trouble had arisen between him and the Church authorities regarding rent due for the schoolhouse.

Mr. Alexander, Colonial Secretary at the Cape, when on his way to England, called on Burchell and, hearing of his intention to visit South Africa, gave him letters of introduction to people in Cape Town. To Cape Town, in the American brig *Harriet*, Burchell sailed on 16th October, 1810, taking with him a minimum of personal belongings, but all his books and boxes of plants for Mr. Alexander and Mr. Hesse.

In his diary he writes :—

> " Viewing my departure I confess I quit the island of St. Helena with very great reluctance : yet I must not remain. I am murdering my valuable time at a place where my hands are tied up from being useful to community."

Two days before leaving, he

> " went to the Botanic Garden with Dr. Baildon, the Medical Superintendent, to give him a list of the names of the most striking plants which he wished to learn, as he meant to propose to the Governor that as the Botanic Garden was now without a superintendent, he was willing to take charge.
>
> The Malay Walnut was the first tree I planted there and is now a most beautiful spreading tree about fourteen feet high : the only one on the Island. I begged Baildon to protect it and prevent it being destroyed as I wished it to flourish as a memorial of me at St. Helena."

The tree did flourish and there is a record of its being in the Botanic Garden in 1882, but when about 1900 during the Boer War, the Imperial Government started building an enlargement to the Barracks which adjoined the Botanic Garden, all the trees were cut down.

The Botanic Garden did not flourish as long as the tree, for in 1813 Dr. Andrew Berry when advising General Beatson to cultivate the Kew Nopal proposed :—

> " a portion of the Garden be devoted to the growth of the Cactus of most value for rearing the fine cochineal, as its object as a Botanic Garden has been frustrated".

General Beatson's *Tracts** does not mention Burchell but there is a reference to Captain Barnes collecting Lichens. From Burchell's diary it can be proved that he was with Barnes when that collecting was done, and from the notes at Kew it is learnt that the originals went to Mr. Dawson Turner, the authority on Fuci, and that they were never returned to the owner.

Burchell's wish to be remembered in connection with St. Helena was carried out when in 1866 (Sir) J. D. Hooker (29) spoke on " Insular Floras " to the meeting held at Nottingham by the British Association for the Advancement of Science. Melliss records the part referring to St. Helena. Hooker had access to the Burchell material which arrived at Kew in 1865 and he collated Burchell's material with Roxburgh's. To several of the indigenous plants Burchell's name was affixed.

Lichtensteinia Burchellii, Hook. f., the dwarf angelica (though now very scarce), growing on Diana's Peak reminds botanists of two great travellers. Melliss gives a full description of the Flora of the Island, and though, since he wrote in 1875, the indigenous plants have become more scarce, Kew possesses Burchell's wonderfully well-preserved Herbarium and his drawings about one of which Melliss wrote : " It is fortunate that Dr. Burchell made a drawing of this plant ; [Ebony] and with the kind permission of Dr. Hooker it has been copied".†

Burchell was once more on the Island in 1815, and of that visit something will be said anon. In the meantime he looks forward to his wanderings in South Africa.

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* Beatson, Alexander : *Tracts relative to the Island of St. Helena.* London, 1816.

† Melliss, J. C. : *St. Helena.* London, p. 229, 1875.

BIOGRAPHICAL NOTES.

(1) CATESBY, MARK (1679-1749), naturalist; voyaged to the New World; in 1719 attracted the attention of Sir Hans Sloane, who acquired several of his specimens. F.R.S. in 1733.

(2) COLLINSON, PETER (1694-1768) had a large business connection with America. F.R.S. in 1728. Formed a botanic garden at Mill Hill, London. He established a good system of botanical exchanges with the colonies.

(3) MILLER, PHILIP (1691-1771), florist in St. George's Fields; was appointed foreman of the Chelsea Garden when Sloane granted it to the Apothecaries' Company; corresponded with Linnaeus, who visited the garden in 1736. Left a large herbarium which was purchased by Banks and is now in Brit. Museum. His chief work was *The Gardener's and Florist's Dictionary.*

(4) COMPTON, HENRY (1632-1713), Bishop of London, has some claim to rank as a botanist, for he planted his grounds at Fulham with "a greater variety of curious exotic plants and trees than had at the time been collected in any garden in England." He obtained most of his rare plants from correspondents in North America.

(5) LAMBERT, ALYMER BOURKE (1761-1842), appointed in 1796 one of the four Vice-Presidents of the Linnean Society of London. He was probably the last to wear the three-cornered official cocked hat of the Society.

(6) KOENIG, CHARLES (1774-1851) came to England in 1800 to arrange the collections of Queen Charlotte; afterwards assistant to Banks' librarian, Dryander. In 1807 became Assistant Keeper and in 1813 Keeper of the Nat. Hist. Dept. in Brit. Museum; finally took charge of the Mineralogical Department.

(7) SALISBURY, RICHARD ANTHONY (1761-1829) studied Botany under Prof. Hope in Edinburgh. In 1809 became Hon. Sec. of Hort. Soc. London; was dismissed; offered to make Alphonse de Candolle his heir. Offer was declined, and he then approached J. E. Gray, who refused it. While Burchell was in Brazil, Salisbury died and left him his collections.

(8) MATON, WILLIAM GEORGE (1774-1835), elected F.L.S. in 1794; was founder of the Linn. Society Club.

(9) BALCOMBE, WILLIAM (1779-1829), merchant and superintendent of Public sales at St. Helena under the East India Company; became purveyor to Longwood when Napoleon resided there; was friendly with the Emperor and had to leave the Island in 1818. He ultimately became Colonial Treasurer of New South Wales.

(10) BANKS, SIR JOSEPH (1743-1820), President of the Royal Society, traveller and patron of science. Went in the *Endeavour* with Capt. Cook. He bequeathed his library and herbarium to Robert Brown, at whose death it went to Brit. Museum. Employed Francis Bauer as draughtsman. As scientific adviser to George III, he also arranged for collectors to gather plants for Kew from abroad.

(11) ROXBURGH, WILLIAM (1751-1815) was assistant surgeon on the East India Company's Estate at Madras; made large collections of plants; in 1787 lost most of these in a flood, but Banks, in 1794, published 300 of his drawings. Roxburgh was superintendent of Calcutta Botanic Gardens. F.L.S. in 1799; F.Soc.Arts; F.R.S.Edin. In 1813 retired to the Cape, then to St. Helena. MSS. of *Flora Indica* in Brit. Museum.

(12) MELLISS, JOHN CHARLES (?), A.I.C.E.; F.G.S.; Commissioner of crown property; surveyor and engineer of the Colony of St. Helena; wrote authoritative work on the Island, a physical, topographical, historical description including geology, fauna, flora and meteorology.

(13) LICHTENSTEIN, MARTIN KARL HEINRICH (1780-1857) studied medicine at Jena. In 1801 appointed medical attendant to the household of General Janssens at Cape of Good Hope. In 1806 returned to Germany; 1811 Professor of Zoology at Berlin and in 1813 Director of Zoological Museum.

(14) PATTON, ROBERT (1742-1812) served in East India Company under Warren Hastings. Governor of St. Helena 1802-07; established telephone system on Island, wrote *Principles of Asiatic Monarchies*, 1803.

(15) BROOKE, THOMAS HENRY (1774-1849), Secretary and Member of the Council of St. Helena. During Napoleonic period was Secretary to the Council and

was responsible for remarkable clearness in style of minutes. Wrote *History of St. Helena*, 1st edition 1808, second edition 1824.

(16) **Forster, George** (1754-1794) assisted his father as naturalist in Capt. Cook's second voyage; made F.R.S. for his share in describing the flora of the South Seas (1775). Sparrman worked with him.

(17) **Barrington, Daines** (1727-1800), lawyer, antiquary and naturalist; said to have induced White to write his *Natural History of Selborne*.

(18) **Barnes, John**, was surveyor and engineer on Island of St. Helena. Published, in 1817, an informative book, *A Tour through the Island of St. Helena*, which contained Roxburgh's catalogue of the Flora.

(19) **Hedwig, Johann** (1730-1799) celebrated German botanist; established the study of cryptogamia on a new basis.

(20) **Dillenius, Johann Jakob** (1681-1747), native of Darmstadt; became first occupant of Sherardian Chair of Botany at Oxford. Linnaeus visited him in 1736. Along with John Martyn, Dillenius founded The Botanical Society in London, 1721.

(21) **Scheuchzer, Jean** (1684-1738), Swiss botanist. On his brother's death in 1733, carried on the work of that naturalist; work *Agrostographica* published in Zurich, 1719.

(22) **Thunberg, Peter** (1743-1828), "Father of Cape Botany"—see *Journal of S.A. Botany*, 1939, for his Life and Work.

(23) **Sloane, Sir Hans** (1660-1753) studied Botany under Magnal and Tournefort. Elected F.R.S. 1685. Sec. Royal Soc. 1693-1712. Founded in 1721 for the Society of Apothecaries, the botanic garden at Chelsea. President Royal Society 1727-1741.

(24) **Persoon, Christien Henri** (1770-1836) born at the Cape of Good Hope. Went to Europe when 12 years of age; graduated M.D. at Göttingen. 1802 went to Paris and devoted himself to botany. He sold his herbarium to Govt. of Holland from whom he received a pension.

(25) **Esper, Frederick Johann** (1732-1781), German philosopher and naturalist. Studied theology. Wrote several works on natural history, among them being, *Adventures, true and wonderful, of many travellers*.

(26) **Hesse, Rev .C. H. F.**, arrived at Cape Town Sept. 1800 as minister of the Lutheran congregation, Strand St.; well known for his classical and intellectual endowments and particularly for his attachment to botany.

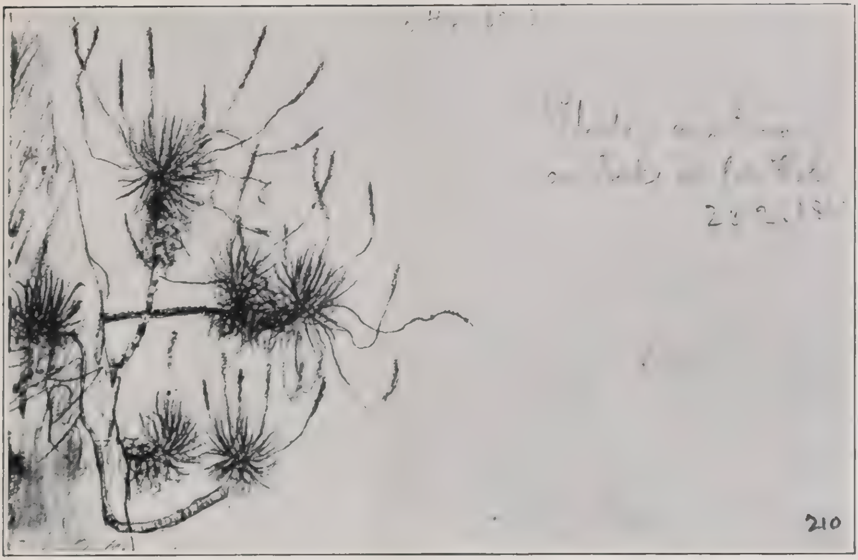
(27) **Beatson, Alexander** (1759-1833), Governor of St. Helena 1808-1813; military career was carried out in India; was a keen agriculturist; introduced the plough and Chinese labour in St. Helena; wrote *Tracts Relative to the Island of St. Helena*. 1816.

(28) **Tilesius, William Gottfried** (1769-1857) studied medicine at Leipzig; he became "Hofrath" in the Russian service; travelled round the world. By the Czar of Russia he was named "Tilesius v. Tileman." Lived in Leipzig, Göttingen, Mülhausen, Dresden.

(29) **Hooker, Joseph Dalton** (1817-1911), naturalist in Ross's Antarctic expedition 1839-43; travelled in India, Syria; worked with Bentham to produce *Genera Plantarum*; was an authority on Insular Floras. Director of Botanic Gardens, Kew, from 1865. Received many honours from English and foreign scientific societies.

(30) **Turner, Dawson** (1775-1858), banker, author, botanist and archaeologist; published important illustrated work on *Natural History of Fuci*, 1808-19.

Plate I.



Drawing : Wm. J. Burchell.

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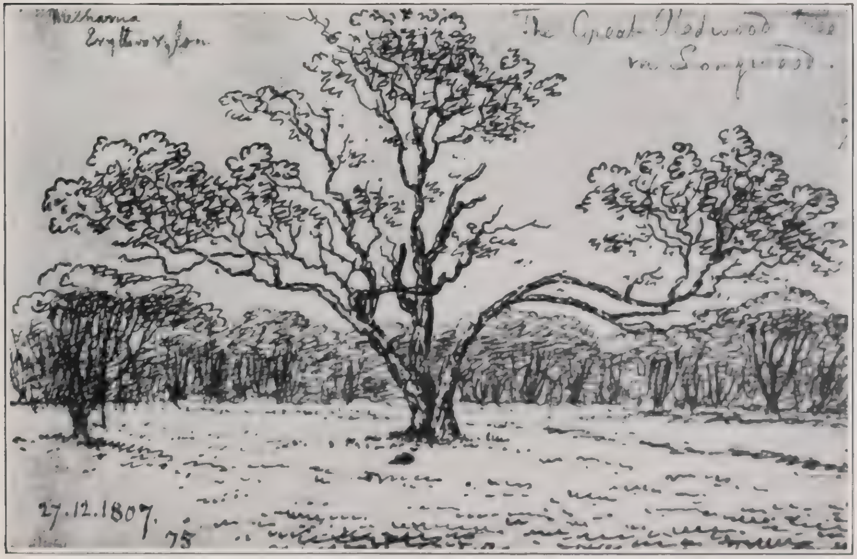
Photograph : James L. Smith, Johannesburg.

"*Plantago robusta*, Rox. A small shrubby native plant, now very scarce, but still to be found growing in the crevices of rocks in the hottest parts of the Island. Blossoms in July and August." Melliss, J. C., *St. Helena*, p. 296, 1875.



Drawing : Wm. J. Burchell

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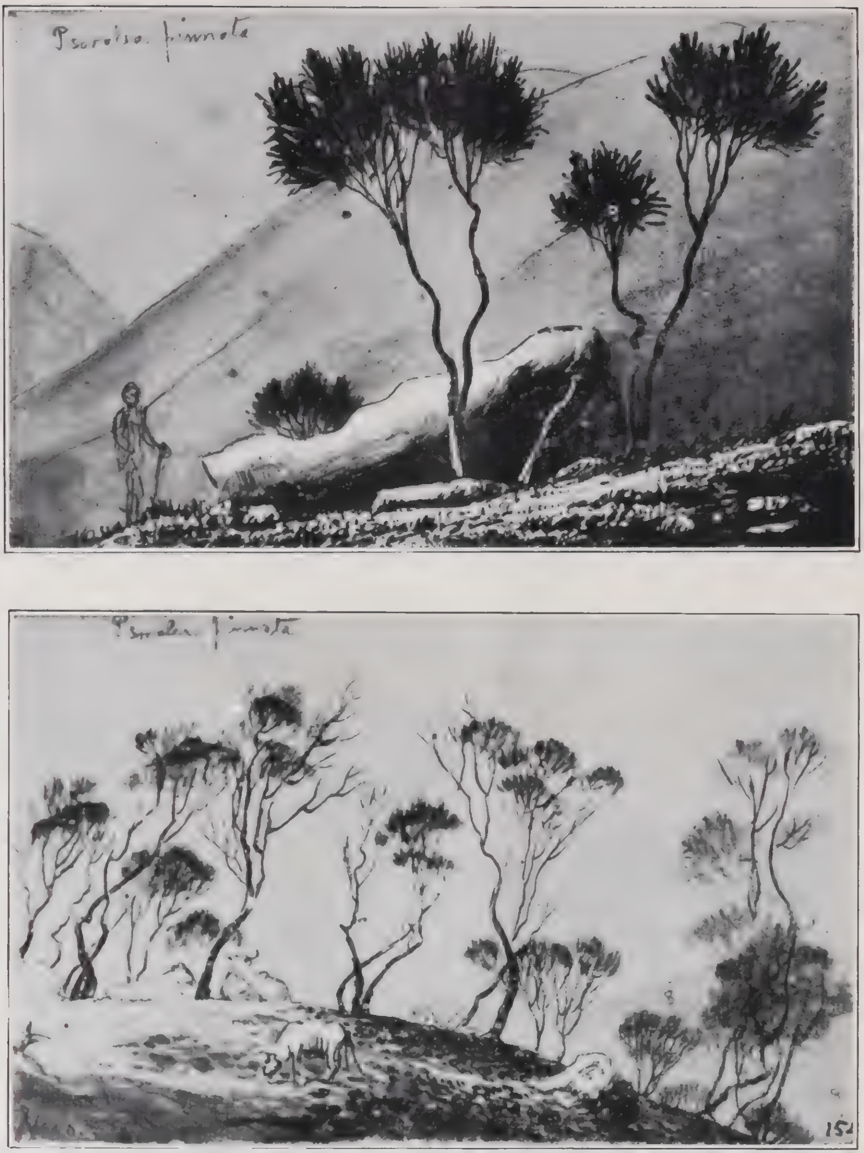
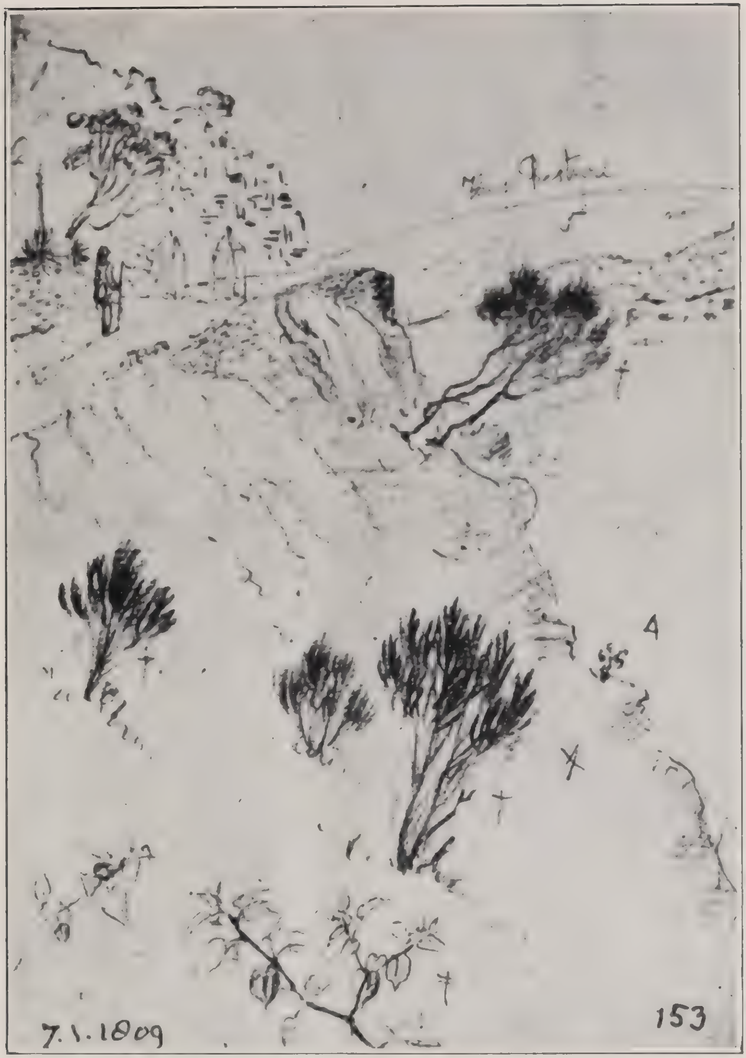
PLATE II.



Drawings : Wm. J. Burchell. Copyright by The Gubbins Trustees.
Photograph : James L. Smith, Johannesburg.

"*Psoralea pinnata*, Linn. The native "Gobbly Gheer"—flowers once a year, at Christmas time : is used for floral decorations and is to the St. Helenian what Holly and Mistletoe are to the people of England. It grows wild to a slight tree, about 10 feet in height and is very common. Doubtless this plant existed in the Island on its discovery." Melliss, J. C., *St. Helena*, p. 261. 1875.

PLATE III.



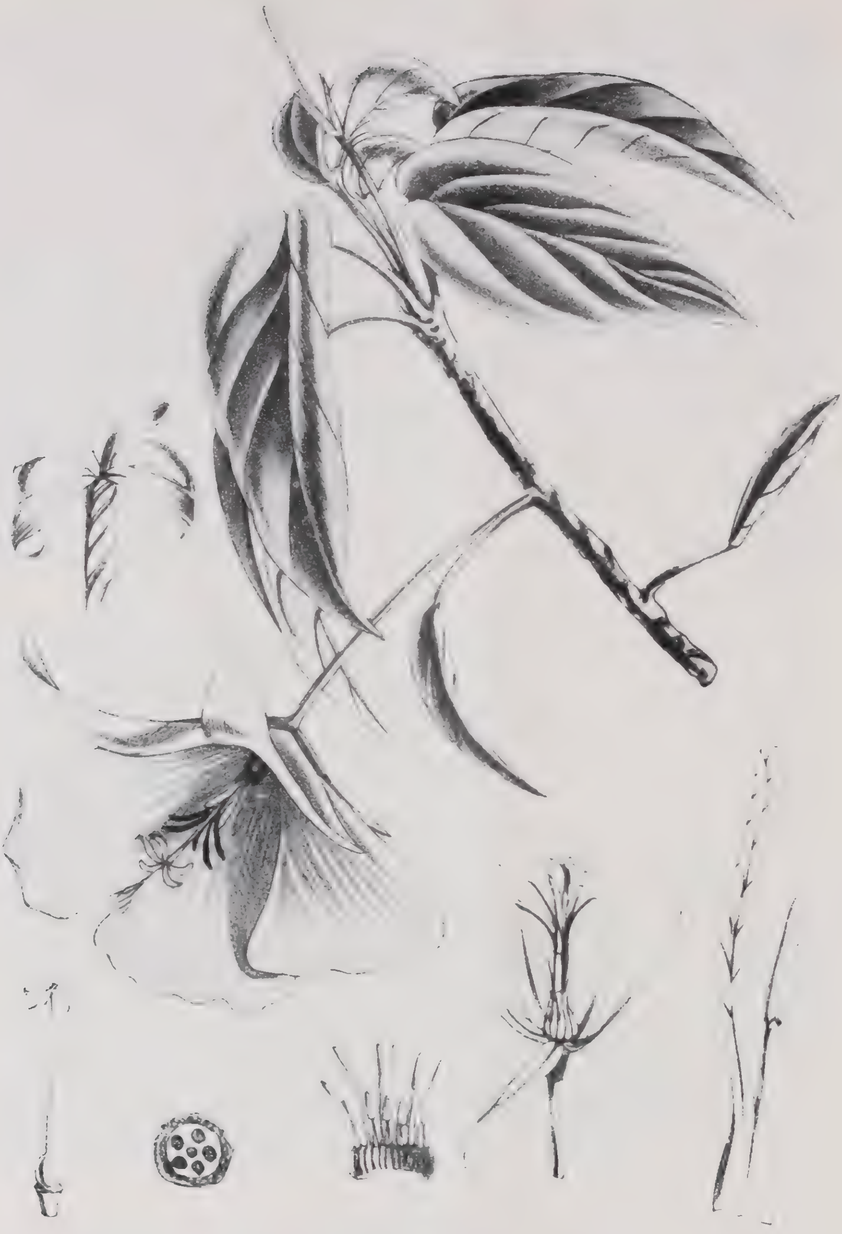
† *Psoralea pinnata* Gobbly Gheer.
4 *Agave.*
‡ *Physalis edulis* Bilberry.

Drawing: Wm. J. Burchell.

Copyright by The Gubbins Trustees.

Photograph: James L. Smith, Johannesburg.

PLATE IV.



The Native Ebony of St. Helena (*Melhania melanoxylon* Ait.; *Trochetia melanoxylon* Benth. and Hook. f.).

In 1813 Dr. Roxburgh saw a few trees of this species about 10 ft. high. By 1865 they were extinct, having been used as fuel.

(Drawings by Burchell, reproduced from J. C. Melliss, "St. Helena". Plate 29.)

IRIDACEAE.

NEW GENERA AND SPECIES AND MISCELLANEOUS NOTES.

By G. J. Lewis.

I. The New Genus Engysiphon.

ENGYSIPHON Lewis gen. nov.

Acidanthera Baker Berl. Monat. XIX, 15. 1876 (partly) *not* Hochst.; Kew Bull. 1906, p. 27; Journ. Linn. Soc. XVI (1877) 160; Handbk. Irid. 186 (1892); Fl. Cap. VI. 130 (1896). *Sphaerospora* Klatt in Linnaea XXXII. 725 (1863) partly, *not* of Sweet.

Cormus parvus, globosus, basin versus oblique complanatus, fibris tunicarum rigidis, lignosis, lucidis, conjunctis. Folium radicale unicum (in *E. roseoalbo* 2 vel 3), lineare, basi amplexicaule, marginibus nervoque medio incrassatis, ciliatis, plus minusve viscosis: folia caulina 1–2, breviora semivaginantia. Bractea herbacea, viridis, rare apice scariosa: bracteolae membranaceae breviores. Perianthii tubus longus cylindricus; segmenta regularia, exteriora longiora. Stamina in apice tubi inserta, unilateralia vel plus minusve arcuata, e tubo exserta; anthera sagittata, dorsifixa, quam filamentum multo breviora. Ramuli styli brevissimi, recurvati. Capsula cylindrica, submembranacea. Semina orbiculata vel subcompressa.

Corm small, not exceeding 1·5 cm. in diam., spherical, more or less obliquely flattened towards the base; tunics of compact, shiny fibres, completely fused together, more or less woody. Stem nearly always simple, flexuous. Leaves usually 1 basal (in *E. roseoalbus* 2 or 3), narrow-linear to linear, erect or falcate, margins and mid-rib raised, frequently viscid and ciliate, other veins usually inconspicuous; cauline 1 or 2, short, half sheathing. Bract entirely herbaceous, green (except in section *Brevitubi* in which it is membranous at apex, obtuse, not very long), 2 cm. or more long, linear, acute. Bracteoles membranous, shorter than and enclosed in bract. Perianth-tube cylindrical, equal in diameter throughout its length, long and slender except in § *Brevitubi*; perianth-segments symmetrically arranged, outer longer than inner. Stamens inserted at throat of perianth-tube, all arranged to one side and more or less arcuate or occasionally symmetrically arranged; filament much longer than anther; anther sagittate, dorsifixed, versatile. Style overtopping or shorter than stamens, branches very short, recurved, densely ciliate along upper margin. Ovary glabrous, cylindrical, membranous. Seeds small, light brown, rounded or somewhat angled by pressure.

I. *Section Longitubi*. Bract firm, green and herbaceous throughout; perianth-tube long and slender, 2 cm. (occasionally 1·5 cm.) to 7 cm. long.

II. *Section Brevitubi*. Bract membranous at apex, soft in texture, perianth-tube 1 cm. or less long, included in bract, perianth-segments much longer than tube.

The name is from the Greek *enguos* = narrow and *siphon* = tube and refers to the long and narrow perianth-tube found in all the species except *E. brevitubus* and *E. roseoalbus* in which it is short.

Engysiphon is very closely related to *Geissorhiza* from which it differs in the following points:—

(1) The stamens and style are usually arranged to one side and are arcuate, occasionally symmetrically arranged (in *Geissorhiza* the stamens and style are always symmetrically arranged).

(2) The filament is long and much exceeds the anther in length, whereas in *Geissorhiza* the filament is not very long and about equals the anther in length.

(3) Except in § *Brevitubi* the bract is firm and herbaceous throughout whereas in *Geissorhiza* it is membranous towards the apex.

(4) The flower is much longer, the perianth-segments comparatively longer and narrower and, except in § *Brevitubi*, the perianth-tube long and slender.

The section *Brevitubi* forms a connecting-link between *Engysiphon* and *Geissorhiza* and further study may show that some or all of the species should be placed in the latter genus. For the present, however, I consider that the species are most naturally regarded as constituting a separate genus.

As far as I can tell from the material collected and examined up to the present, the genus *Engysiphon* does not occur outside the Western Cape Province, and within that area it appears to be confined to the coastal belt. The species flower in the spring and early summer and apparently always grow in sandy soil, either on sandy flats or sandy mountain slopes.

KEY TO SPECIES.

I. § *Longitubi*.

Leaves very narrow, more or less terete in appearance.

- Perianth-segments acute, narrow-linear; plant very slender. *roseus* (1)
- Perianth-segments obtuse, linear, the outer sometimes shortly acute.
  - Perianth-tube long and slender, less than 4 cm. long. *pictus* (2)
  - Perianth-tube very long and slender, 5 cm. or more long. *longitubus* (3)

Leaves linear, flat.
Perianth-tube very long and slender, 5 cm. or more long, segments much shorter. *longitubus* (3)
Perianth-tube 2—4 cm. long ; segments equal to or exceeding perianth-tube, occasionally a little shorter.
Perianth-segments exceeding tube in length, broad, obtuse, more or less oblong. *Schinzii* (4)
Perianth-segments about equal to, or slightly shorter than tube, never longer.
Flower comparatively small (usually under 5 cm. including perianth-tube and segments), 3—9 in inflorescence, basal leaf usually overtopping inflorescence. *longifolius* (5)
Flower large, 5 cm. or more in length, 1—4 in inflorescence, basal leaf sometimes reaching top of inflorescence, very seldom exceeding it. *exscapus* (6)
II. § *Brevitubi.*
Basal leaf (1 only) with margins and mid-rib raised, viscid and minutely ciliate ; bracteoles much shorter than bract. *brevitubus* (7)
Basal leaves (2 or 3) glabrous, margins and mid-rib very little raised, bracteoles nearly as long as bract. *roseoalbus* (8)

(1) **E. roseus** (Schinz) Lewis comb. nov.

Acidanthera rosea Schinz in Bull. Herb. Boiss. 11. 222 (1894) ; Baker, Fl. Cap. VI. (1896). *Acidanthera sabulosa* Schlechter in Engl. Bot. Jahrb., XXVII (1900) p. 101.

Cape Peninsula —Chapmans Bay, Lewis, S.A.M. 53713 ! Muizenberg, Pappe, S.A.M. 21121 ! Diep River Flats, Marloth 7154 (N.H.) ! Table Mountain, above Oranjezicht, Marloth 10714 (N.H.) ! Cape Flats, Wynberg, Kensit, B.H. 13419 (B.H.) ! Camp Ground, Dod 3419 (B.H.) ! Claremont Flats, Guthrie 1347 (B.H.) ! Cape Div.—between Melkbosch Road and Mamre, L. Bolus, B.H. 19976 !

(2) **E. pictus** (Foster) Lewis comb. nov.

Acidanthera picta Foster in Contrb. Gray Herb. CXIV, 44 (1936). *Acidanthera tubulosa* (Houtt.) Baker in Journ. Linn. Soc. XVI, 160 (1877) ; Handbk. Irid. 186 (1892) as to name but not as to plant described ; *A. tubulosa* (Houtt.) N.E. Br. in Kew Bull. (1929) 137. *Ixia tubulosa* Burm. f. Fl. Cap. Prodr. 1 (1768) in part ; Houtt. in Handl. XII, 36, t. 78, f. 2 (1780).

There is a tracing of the Houttyn type figure in the Bolus Herbarium which, although incomplete, shows the perianth-tube to be the same length as the bract, the perianth-segments regular and equal, a little shorter than the tube. The species from the Cape Peninsula, which has broader and longer perianth-segments than the above species seems to agree very well with this figure. The perianth-tube is variable in length, sometimes as long as the bract, sometimes exserted and longer.

Cape Peninsula—Constantiaberg, Adamson, S.A.M. 52939 ! Klaver Valley, Lewis, S.A.M. 54128 ! Salter 7825 (S.A.M.) ! Compton 5268

(B.H.) ! near Cirkels Vlei, Salter 2846 (B.H.) ! Muizenberg Plateau, Kensit, B.H. 22564 (B.H.) ! near Simonstown, Bolus, B.H. 4691 ! Dod. 2036 (B.H.) ! Riversdale, Bolus, B.H. 22561 !

(3) **E. longitubus** Lewis sp. nov.

Cormus ignotus. Caulis 22—60 cm. alta, simplex, rigida, flexuosa. Folium radicale subteres, marginibus et nervo medio bene incrassatis, minute ciliatis, paulo viscosis, quam inflorescentiam breviore, circa 21—25 cm. longum (raro ad 57 cm.), 2—6 mm. latum ; folia caulina 6—12 cm. longa. Bractea glabra, nervis obscuris, 6 cm. longa ; bracteolae brevissimae. Tubus perianthii gracillimus e bractea exsertus 5·5—7 cm. longus, segmenta tubo breviora obtuse vel acutiuscula, circa 3 cm. longa, 5 mm. lata. Stamina segmentis aequilonga, filamentis 2·2 cm. longis, antheris 8 mm. longis, stylo paulo breviora.

Clanwilliam Div.—Warm Baths, Leipoldt, B.H. 20840 (type, in B.H.) ! Nardouw Pass, Lewis, B.H. 22255 (B.H.) ! Oliphants River, Eck. and Zey. (N.H. without no.) ! Piquetberg Div.—top of Versfeld's Pass, Pillans 7148 (B.H.) ! Piquetberg, Marloth 6580 (N.H.) ! near Eendekuil, Howes 194 (N.H.) ! Malmesbury Div., near Hopefield, Salter 3905 (B.H.) ! Without locality, Eck. and Zey. N.H. 9995 !

Corm not seen. Plant 22—60 cm. high, stem simple, firm, flexuose. Basal leaf subterete to linear, margins and mid-rib well raised, minutely ciliate, more or less viscid, not overtopping inflorescence, about 21—25 cm. long (up to 57 cm.), 2—6 mm. broad ; cauline leaves acuminate, 6—12 cm. long. Inflorescence secund, fairly lax, 3—6-flowered. Bract glabrous, veins inconspicuous, usually 6 cm. long ; bracteoles much shorter. Perianth-tube exserted from bract, very slender, 5.5—7 cm. long ; segments shorter than tube, linear, obtuse or occasionally shortly acute, about 3 cm. long, 5 mm. broad. Stamens reaching top of perianth-segments, filament 2·2 cm. long, anther 8 mm. long. Style just overtopping anthers.

(4) **E. Schinzii** (Baker) Lewis comb. nov.

Acidanthera Schinzii Baker in Kew Bull. 1906, 27.

Type from Caledon Div., Houw Hoek, Penther 587 (*ex parte*). Specimens which agree fairly well with the description (type not seen) are the following :—

Caledon Div.—Shaws Mtn., Barker 9 (B.H.) ! Bolus, B.H. 22562 (B.H. and in N.H. without no.) ! Gillett 46 (B.H.) ! Bot River, Mathews, N.B.G. 1515/30 (B.H.) ! Caledon, Marloth 7010 (N.H.) !

The perianth-segments in this species are the broadest in the section *Longitubi* and slightly exceed the perianth-tube in length. The leaves are very viscid and all specimens seen show them with particles of sand adhering along the ridges.

(5) **E. longifolius** Lewis sp. nov.

Cormus ad. 1·4 cm. diam., tunicis apice setosis. Caulis 13—37 cm. alta, simplex, flexuosa, gracilis. Vagina basalia 1, acuta. Folium radicale inflorescentiam fere superans marginibus et nervo medio bene incrassatis, viscosis, circa 32 cm. longum, 4 mm. latum ; folia caulina 2, 3—7 cm. longa. Bractea nervis prominentibus fere hispidula. Perianthii tubus bractea aequilongus vel longior : segmenta obtusa vel acutiuscula. Stamina filamentis 1—1·3 cm. longis, antheris 5 mm. longis. Stylus antheris aequilongus.

Clanwilliam Div.—Nieuwoudt Pass, Leighton, B.H. 22558 (type, in B.H.) ! Algeria, Lewis, B.H. 22270 ! Langevallei, Compton 5418 (B.H.) ! Oliphants River, Schlechter 5030 (B.H.) ! Citrusdal, Stanford, B.H. 22555 ! Clanwilliam, Leipoldt, B.H. 22556 ! North of Citrusdal, Taylor 1036 (B.H.) ! Witsenberg and Skurfdeberg, Zeyher 1607*a* (N.H.) ! Mostertsberg, MacOwan, S.A.M. 21110 !

Corm up to 1·4 cm. diam. ; tunics of very hard fibres, ending in sharp bristles at apex. Plant 13—37 cm. high, stem simple, flexuose, slender. Basal sheath 1, colourless, acute, 4—8 cm. long. Leaf 1 basal, linear, nearly always overtopping inflorescence, erect or spreading, margins and mid-rib well raised, viscid, minutely ciliate along inside edges, about 32 cm. long, 4 mm. broad ; cauline 2, acuminate, 3—7 cm. long. Inflorescence 3—9-flowered, secund, compact. Bract firm, distinctly veined, usually sparsely and coarsely hispidulous, 2·8—1·8 cm. long ; bracteoles up to 1·2 cm. long. Perianth-tube reaching top of bract or exserted, usually 2 cm. long (up to 2·5 cm.) ; segments obtuse or shortly acute, 2—2·5 cm. long, 4—8 mm. broad. Stamens reaching two-thirds way up segments, filament 1—1·3 cm. long, anther 5 mm. long. Style reaching top of anthers, branches slightly overtopping anthers.

(6) **E. exscapus** (Thunb.) Lewis comb. nov.

According to Foster in Contrb. Gray Herb. CXIV, 44 (1936), the synonymy should be as follows :—*Acidanthera exscapus* (Thunb.) Baker in Berl. Monat. XIX, 15 (1876). *Gladiolus exscapus* Thunb. Prodr. 184 (1800) and in Naturhist. Selsk. Kobenh. (1810) 3, t. I ; Ker, Gen. Irid. 146 (1827). *Acidanthera tubulosa* (Houtt.) Baker in Journ. Linn. Soc. XVI, 160 (1877) ; Handbk. Irid. 186 (1892) ; Fl. Cap. VI, 132 (1896) as to plant described. *Sphaerospora exscapus* Klatt in Linnaea XXXII, 725 (1863).

Paarl Div.—Bains Kloof, Carter B.H. 22560 ! Schlechter 9162 (N.H.) !

Thorne, S.A.M. 46473 ! Salter 5112 (B.H.) ! French Hoek Mtns. Marloth 7011 (N.H.) ! near summit of French Hoek Pass, Galpin 12284 (N.H.) ! Salter 4180 (B.H.) ! Caledon Div.—Zwartberg, Pappe, S.A.M. 21108 ! Zeyher, S.A.M. 21111 ! B.H. 22557 ! Worcester Div.—Worcester, Cooper 1678 (B.H.) ! Ceres Div.—Ceres, Leslie, N.B.G. 2602 '27 (B.H.) ! Tulbagh Div.—near Tulbagh Waterfall, Bolus, B.H. 5253 !

(7) **E. brevitubus** Lewis sp. nov.

Cormus ignotus. Caulis 17—43 cm. alta, simplex vel ramosa. Folium radicale inflorescentiam aequilongum vel superans, marginibus et nervo medio incrassatis, minute ciliatis, viscosis ; folia caulina 1 vel 2, acuminata. Inflorescentia secunda, laxa, 2—3-flora. Bractea tener, apice membranacea, obtusa, bracteolis membranaceis, multo brevioribus. Tubus perianthii in bractea inclusus, circa 1·1 cm. longus ; segmenta obtusa. Stamina unilateralia, arcuata, filamentis circa 2 cm. longis, antheris 6 mm. longis. Stylus antheris aequilongus.

Piquetberg Div.—top of Piquetberg Mt., Bolus, B.H. 13651 (type, in B.H. and N.H.) ! Piquetberg, Guthrie 2705 (B.H.) !

Corm not seen, remains of tunics hard, woody, light brown. Plant 17—43 cm. high ; stem simple or branched, flexuose. Leaf 1 basal, linear, as long as or overtopping inflorescence, margins and mid-rib raised, minutely ciliate and viscid ; cauline 1 or 2, acuminate. Inflorescence lax, secund, 2—3-flowered. Bract soft, membranous at apex, obtuse, 1·5—2 cm. long. Bracteoles membranous, much shorter. Perianth-tube included in bract, about 1·1 cm. long ; segments all obtuse, outer 3·3 cm. long, 1 cm. broad, inner 2·9 cm. long, 1·1 cm. broad. Stamens arranged to one side, arcuate ; filament about 2 cm. long, anther 6 mm. Style reaching top of stamens, branches well recurved at apex. Ovary 5—6 mm. long, 2·5 mm. diam.

(8) **E. roseoalbus** (Lewis) Lewis comb. nov.

Acidanthera roseoalba Lewis in S.A. Gard. Vol. XXIII (1933), 225.

George Div.—Doorn River, Fourcade 4744 (type, in B.H.) ! Geelhoutbosch, Taylor 1628 (B.H.) !

This species differs from the above and all the other species in having 2 or 3 basal leaves which are glabrous, the margins and mid-rib only very slightly raised. The bract is entirely herbaceous or membranous at the apex, obtuse or shortly acute, soft in texture and drying more or less membranous, 2 cm. or less long. Bracteoles a little shorter. The flower is typical of this genus, the stamens, which have filaments much exceeding the anthers in length, are arranged well to one side and arcuate. The perianth-tube is included in the bract and does not exceed 1 cm. in length.

II. REVISION OF SPECIES PLACED UNDER ACIDANTHERA BY BAKER IN FL. CAP. VI. AND PUBLISHED SINCE THEN.

An examination of the material available has disclosed the fact that the genus *Acidanthera*, according to Baker, includes representatives of 5 genera, namely: *Babiana*, *Gladiolus*, *Hesperantha*, *Tritonia* and *Engysiphon*.

The genus *Acidanthera* Hochst. Flora 1844. 25 was based upon *A. bicolor* from Abyssinia and, according to the description and a figure seen by myself at Kew in 1934, is extremely closely related to *Gladiolus* (I consider that it is a *Gladiolus*), differing only in having a longer perianth-tube, which is more or less equal in diameter throughout its length, and perianth-segments which are very nearly equal.

Elongation of the perianth-tube occurs in many of the South African *Iridaceae* and I do not consider that this character alone is a sufficient one upon which to found a new genus. Among the *Iridaceae* studied by myself this elongation is found in *Babiana*, *Tritonia*, *Ixia*, *Lapeyrousia* and even *Romulea*, a genus which normally has a very short, funnel-shaped perianth-tube. (A new species of *Romulea* with a long, cylindrical perianth-tube is described in this paper.) Although this elongation of the perianth-tube makes the flower appear quite distinct from other members of the genus, the floral characters and vegetative characters, which I consider of the greatest importance in classifying the genera in *Iridaceae*, namely, the corm, leaves and bracts, do not, in the genera mentioned above, differ in any important detail from those typical of the various genera to which they belong.

I do not propose to deal with *Acidanthera bicolor* Hochst., the type of the genus, or any of the Tropical African species in this paper as I have not a sufficient knowledge of the North and Tropical African *Iridaceae*, but I must point out how the South African genus *Engysiphon* differs from *Acidanthera* (Hochst.) and why I consider that the other South African species placed under *Acidanthera* by Baker and other botanists do not belong there, but belong to the various genera mentioned above.

According to the description and the figure seen, *Acidanthera bicolor* has a corm about 2·5 cm. diam. surrounded by tunics of matted fibres reticulated upwards, and 2 basal leaves which are erect, linear, fairly firm, the veins inconspicuous. The lowest 1 or 2 cauline leaves resemble the basal leaves. The three lower perianth-segments are marked with a dark purple spot at the base, which means that the 3 upper and 3 lower perianth-segments are distinct.

In *Engysiphon*, apart from the differences in the corm and leaves (see description of the genus), the perianth-segments are regularly arranged, patent, all equal, or more often the three outer slightly longer than the 3 inner, nearly always obtuse and concolorous, or, if marked, with corresponding marks on both outer and inner segments (*e.g. E. roseoalbus*).

The following species included in *Acidanthera* are in the sequence given in Fl. Cap. VI. 130 (1896) :—

(1) *Acidanthera brachystachys* Baker. This is **Babiana brachystachys** (Baker) Lewis in Fl. Pl. S. Afr. Vol. XIV, 546.

(2) *A. graminifolia* Baker. (Type in British Museum.) I have not seen the type, but from the description this is almost certainly a *Gladiolus*, probably related to *G. undulatus* and *G. Milleri*. I propose changing the name to **Gladiolus graminifolius** (Baker) Lewis.

(3) *A. platypetala* Baker partly = *Gladiolus longicollis* Baker in Journ. Bot. 1876, 182. *A. platypetala* Baker Handbk. Irid. 186 (1892), Fl. Cap. VI, 131. *A. longicollis* (Baker) Foster in Contrb. Gray Herb. CXIV, 42 (1936).

This species belongs to the section of *Gladiolus* comprising *G. grandis*, *G. tristis*, *G. maculatus* and a few others. It differs only in having a slightly longer and more slender perianth-tube. The corm, leaves, bract, stamens, stigma, ovary and winged seeds are identical with those of the species mentioned above. It is most closely related to *G. maculatus*, and in some specimens the perianth-tube exceeds that of *G. maculatus* by 1 cm. only.

The type number, Baur 505, from Baziya Mt. is in the Bolus Herbarium. The perianth-segments are almost equal, acuminate, the perianth-tube about half as long again as the bract, curved ; stamens just exserted from the mouth of the perianth-tube or sometimes the base of the anther included. The flowers are yellow, mottled with brown, usually 3, sometimes 1 or 2 only, arranged in a lax spike.

This is an Eastern Province species extending northwards to Natal, where it merges into the next species, *Gladiolus praelongitubus* Lewis sp. nov. As is very often the case, it is difficult to find an exact dividing line between the two species, the typical forms of which are quite distinct. In the Natal specimens of *G. longicollis* the perianth-tube is longer, up to twice the length of the bract, and the segments acute instead of acuminate, agreeing with Baker's description of *Acidanthera platypetala*, a Natal species. There seems little doubt, however, that the Natal plants are merely a form of *Gladiolus longicollis*, plants with the comparatively short and very long perianth-tube being found in the same locality.

Eastern Province.—Baziya Mt., Baur 505 (co-type in B.H.) ! Katberg, Gaikas Kop, Young, N.H. 15026! Komgha, Flanagan 1095 (S.A.M.) Griqualand East, Zuurberg, Tyson 1874 (S.A.M.)! near Kokstad, Tyson 1536 (S.A.M.)! Somerset East, Boschberg, MacOwan, S.A.M. 21331! *Orange Free State.*—Ficksburg, Galpin 13839 (N.H. and B.H.)! Vrede, O'Meara, N.B.G. 2045/33 (B.H.)! *Basutoland.*—Leribe, Dieterlen 232 (S.A.M.)! *Natal.*—Durban, Wood 108 (S.A.M.)! Howick, Karkloof, Symons, S.A.M. 11370! Mooi River, Mogg 3107 (N.H.)! Mogg 3244 (N.H.)! Polela, near Underberg, Dyer 3239 and 3247 (N.H.)! Estcourt, West 411 (N.H.)! *Transvaal.*—Vereeniging, Leendertz 5667 (B.H.)!

Gladiolus praelongitubus Lewis sp. nov.

Acidanthera transvaalensis N.E.Brown, MS. *A. platypetala* Baker in Fl. Cap. VI, 131 (1896) partly.

Cormus depresso-globosus, circa 2·5 cm. diam., tunicis e fibris crassis superne reticulatis, infra parallelis, compositis. Vaginae basales 2, obtusae. Planta 35—75 cm. alta (saepius circa 60 cm.), caule simplice, gracile, fere omnino foliis circumfusis. Folium basale 1, vagina tubulosa laminam subaequilonga inflorescentia brevius, acuminatum, anguste lineare, nervo medio marginibusque crassis; folia caulina 2 similia laminis perbrevibus. Bractea obtusa vel acuta, linearis; bracteolae similes. Tubus perianthii gracillimus, cylindricus, apice vero tantum parum ampliatus, curvatus, bracteam bene superans, circa 11 cm. longus, apice 5—6 mm. diam.: segmenta exteriora similia, acuminata, 3 interiora similia, acuta, breviora. Stamina prope apicem tubi adnata, filamentis circa 8 mm. longis, antheris sagittatis, in tubo perianthii pro parte inclusis, ad 1·5 cm. longis. Styli ramuli stamina superantes, apicibus ampliatis, conduplicatis. Semina alata.

Transvaal.—Barberton District.—Barberton, mountain sides, Galpin 530 (type, in S.A.M., B.H. and N.H.)! Schaque Mt., Liebenberg 2837 (N.H.)! Berlin, Godwan River, Hofmeyr 76 (N.H.)! Kaapsche Hoop, Phillips 3459 (N.H.)! Pole Evans 958 (N.H.)! Barberton, Holt 338 N.H.)! Ermelo District.—Nooitgedacht, Henrici 1270 (N.H.)! Convent Pupils 156 (N.H.)! Lake Chrissie, Hamilton, N.H. 4293! The Glen, Walker 130 (N.H.)! *Carolina District.*—Galpin 12373 and 12527 (N.H.)! *Graskop District.*—Galpin 14571 (N.H.)! *Lydenburg District.*—Gray, N.H. 4481! Sekukuniland, Barnard 437 (N.H.)! *Belfast District.*—Dullstroom, Galpin 13177 (N.H. and B.H.)! *Waterberg District*—near Potgietersrust, Galpin 9158 (N.H.)! *Pilgrims Rest District.*—MacMac Kloof, Smuts and Gillett 2252 (N.H.)! Mauchsberg, Sabie, Smuts and Gillett 2302 (M.H.)! Sabie River, Mudd (without no., in B.H.)! *Krugersdorp District.*—Witpoortje Kloof, Murray 684 (N.H.)! Moss 13509 (N.H.)! Nelsberg, Taylor 1989 (N.H.)! *Zoutpansberg District.*—

Sebasa, West of Pepiti, Smuts and Gillett 3280 (N.H.)! Drakensberg, Devils Kantoor, Bolus, B.H. 7617! 9784!

Swaziland—near Mbabane, Bolus, B.H. 12339! Hlatikulu, Stewart 58 (S.A.M.)!

Natal.—St. Lucia Bay, Pole Evans 3659 (N.H.)! Clairmont, Wood 10489 (B.H. and N.H.)! Tweekloof, Thode A.1189 (N.H.)! Camperdown, Drummond, Galpin 10292 (N.H.)!

Orange Free State.—Viljoen's Drift, Burtt Davy 7006 (N.H.)!

This species differs from *G. longicollis* in having a very long perianth-tube, usually more than twice the length of the bract; the inflorescence is nearly always 1-flowered, sometimes 2 or 3-flowered; the outer perianth-segments are longer than the inner. The flowers are creamy-white or yellowish, brown or green veined, sweetly scented. The anthers are half included and half exserted from the perianth-tube.

Corm depressed globose, about 2·5 cm. diam., tunics of coarse fibres, parallel in lower half. Basal sheaths 2, obtuse, about 3·5 and 5·5 cm. long. Plant 35—75 cm. high (usually about 60 cm.), stem simple, slender. Leaf 1 basal, fused round stem for half its length or more, shorter than inflorescence, firmly veined, margins and mid-rib well raised, narrow-linear, acuminate, cauline 2, similar to basal, with short, free, acuminate tips, almost entirely enclosing stem. Bract obtuse or acute, linear, 4—5·5 cm. long; bracteoles similar. Perianth-tube very slender, cylindrical, widening very slightly towards throat, curved, 2—3 times as long as bract, about 11 cm. 5—6 mm. diam. at throat; segments—3 outer similar, acuminate, 2·5—3·5 cm. long, about 1·2 cm. broad, 3 inner acute, shorter than outer, 2—2·5 cm. long, about 1 cm. broad. Stamens attached to perianth-tube shortly below throat, filament about 8 mm. long; anthers half included in throat of perianth-tube, sagittate, up to 1·5 cm. long. Style branches just overtopping stamens, 7 mm. long, apex flattened conduplicate. Seeds winged.

(4) *A. Forsythiana* Baker, Handbk. Irid. 186 (1892); Fl. Cap. VI, 131 (1896).

I have not seen the type, but from the description this seems to be a long-tubed form of *Gladiolus angustus* Ker and the name should therefore become a synonym of this species. A specimen in the Bolus Herbarium, Bachmann 298, named *A. Forsythiana* by Baker at Kew in 1888, is undoubtedly a form of *Gladiolus angustus* with a longer perianth-tube than is usual.

(5) *A. flexuosa* Baker. This is *Gladiolus flexuosus* Linn. f. Suppl. 96 (1781); Thunb. Diss. Glad. 9, t. 1 (1784).

There is a drawing at Kew of an imperfect specimen without leaves or corm and with poor flowers. On the sheet N. E. Brown has made the following notes, which he has published in his paper on the *Iridaceae* of Thunberg's Herbarium in Journ. Linn. Soc. XLVIII no. 319, p. 22 (1928). —" This is identical with the type of *Gladiolus flexuosus* Linn. f. and equals *Acidanthera flexuosa* Baker. As the perianth is irregular, I do not understand why it is not a true *Gladiolus*. There is no specimen like it in the Kew Herb." He also states, on the drawing only, that it is allied to *Gladiolus pulchellus* Klatt.

Without seeing the type I cannot be certain about this species, but in view of Dr. Brown's remarks, it seems best to leave this as *Gladiolus flexuosus* L.f. although examination of the type, when this is possible, may prove it to belong to the genus *Engysiphon*.

Acidanthera flexuosa Baker in Berl. Monat. XIX, 15 (1876) ; Handbk. Irid. 186 (1892) ; Fl. Cap. VI, 131 (1896) and *Sphaerospora flexuosa* Klatt in Linnaea XXXII, 726 (1863), are the same plant.

Baker has overlooked Linne's and Thunberg's use of the name *Gladiolus flexuosus* and has given this name to a Tropical African plant (in Kew Bull. 1894, 390 ; Fl. Trop. Afr. VII, 372). As this is incorrect I propose changing this name to **Gladiolus gracilicaulis** Lewis nom. nov.

(6) *A. tubulosa* Baker. This is *Engysiphon pictus* (Foster) Lewis as to name but not description and *Engysiphon exscapus* (Thunb.) Lewis as to plant described. (See above, pp. 21, 23.)

(7) *A. rosea* Schinz. This is *Engysiphon roseus* (Schinz.) Lewis.

(8) *A. pauciflora* Benth. This is definitely a Gladiolus, related to *G. undulatus* and *G. Milleri* and may prove to be only a variety or form of the former species. For the present, until more material has been seen, it seems best to leave it as a separate species under the name **Gladiolus Bowkeri** Lewis nom. nov. (The name *pauciflorus* has already been used in this genus.) The specific name is in honour of Mr. Bowker, the finder of the type specimens. *Acidanthera pauciflora* (Baker) Benth. and Hooker Gen. Pl. III, 706 (1883) ; Baker Handbk. Irid. 187 (1892) ; Fl. Cap. VI, 132 (1896). *Montbretia pauciflora* Baker in Journ. Bot. 1876, 336.

The following note was made by myself at Kew in 1934 when I saw the type specimens—" Leaves similar to those of many *Gladioli* (§ *Blandi*) and in a couple of specimens on the type sheet they are distinctly spotted or mottled near the base as in *G. vomerculus*. The perianth-tube is comparatively short, slightly exserted from the bract, curved and distinctly dilated in the upper part." There are photographs of the type sheet in the Bolus and National Herbaria.

(9) *A. brevicaulis* Baker, Fl. Cap. VI, 132 (1896). I do not know this species, but it is most probably a *Hesperantha*. I propose changing the name to **Hesperantha brevicaulis** (Baker) Lewis comb. nov.

(10) *A. Huttoni* Baker in Journ. Bot. 1876, 339 ; Fl. Cap. VI, 133 (1896) Journ. Linn. Soc. XVI, 160 (1877) Handbk. Irid. 187 (1892). This is *Hesperantha longituba* Baker and the name should become a synonym of this species.

A specimen in the National Herbarium from the type locality, Katberg, named *A. Huttoni* by N. E. Brown, was examined. The material is very poor, but the flower has three long style branches arising from the throat of the perianth-tube.

Eastern Province.—Katberg, Galpin 2067 (N.H.) !

(11) *A. Tysoni* Baker. This is **Hesperantha grandiflora** Lewis nom. nov. *Acidanthera Tysoni* Baker Handbk. Irid. 187 (1892) ; Fl. Cap. VI, 133 (1896). There is already a *Hesperantha Tysoni*, and therefore, as the flowers are the largest seen in the genus, I propose the above name. A figure on the type sheet in the Bolus Herbarium (? drawn by Tyson) shows the 3 long style branches arising at the throat of the perianth-tube, but also shows them and the stamens arranged rather to one side and arched, not in the centre and equally divaricating as is typical of the genus *Hesperantha*. As far as can be seen from the dried material there is considerable variation, the stamens sometimes being in the centre, equally divaricating, or all arranged to one side. Although differing in this point from the rest of the genus *Hesperantha* I feel that it can only belong to this genus on account of the characteristic style branches. The vegetative characters agree with those of *Hesperantha*.

Maclear Div.—Drakensberg, Galpin 6857 (B.H. and N.H.) ! Griqualand East, near Cataracts on Mt. Currie, Tyson 1151 (type, in S.A.M. and B.H.) ! MacOwan and Bolus, Herb. Norm. 895 (S.A.M.) !

(12) *A. capensis* Benth. This is **Tritonia flabellifolia** (Delaroche) Lewis comb. nov. *Acidanthera flabellifolia* N.E. Br. Kew Bull. 1929, 135. *Ixia flabellifolia* Delaroche, Descr. Pl. Nov. 20 (1766) ; *I. tubulosa* Burm. f. Fl. Cap. Prodr. 1. (1768) in part. *Acidanthera capensis* Benth. Gen. Pl. 111, 706 (1883) ; Baker, Handbk. Irid. 187 (1892) ; Fl. Cap. VI, 133 (1896). *Houttuynia capensis* Houtt. Handbk. XII, 448, t. 85 (1773). *Tritonia capensis* Ker in Konig and Sims Ann. 1, 228 (1805) ; Bot. Mag.

t. 618 (1803); Gen. Irid. 116 (1827); Klatt in Linnaea XXXII, 757 (1863). *Montbretia capensis* Baker in Journ. Linn. Soc. XVI, 168 (1877). *Gladiolus roseus* Jacq. Ic. t. 261 (1796). *Tritonia rosea* (Jacq.) Ait. Hort. Kew. ed. 2, 1, 91 (1810).

The bract is slightly larger and more acute than is usual in the genus *Tritonia*, but the corm, leaf and floral characters, as well as the membranous bract belong to that genus.

(13) *A. brevicollis* Baker. This is **Gladiolus sabulosus** Lewis nom. nov. (The name *brevicollis* is already used in the genus *Gladiolus*.)

Baker, in Fl. Cap. VI, 134 (1896), gives as a synonym *Gladiolus Gueinzii* Kunze in Linnaea XX, 14 (1847). If this is correct then the species should have been named *Acidanthera Gueinzii*, Kunze's specific name being the older, and should now be known as *Gladiolus Gueinzii*. According to the description, however, I do not think that they are the same and therefore propose the above name for this species. The type of *Gladiolus Gueinzii* is from "Cape of Good Hope," flowering in March. This species flowers from October to December and is found growing on sandy dunes along the coast from Knysna to Natal.

This is a puzzling species which does not fit into any of the genera as known at present, except *Gladiolus*, and from that it differs in its almost equal perianth-segments and stamens, which apparently are sometimes equally divaricating. The leaves are rather fleshy or thickened but not firm, the mid-rib and margins raised, but the other veins inconspicuous. The corm is globose, enclosed in fibrous tunics, which are more or less membranous but firm, more or less fused together or the fibres distinct, parallel in the lower half. The seed, which has a large, membranous wing, is typical of *Gladiolus*.

Description.—Corm globose, about 14 cm. diam. Plant 17—50 cm. high, usually about 30 cm. Stems simple or sometimes branched, firm. Leaves 2 or 3 basal, linear, acute, usually overtopping flowers, about 35—40 cm. long, 3—4 mm. broad; cauline 2 or 3, lower similar to basal leaves, frequently bearing cormlets in axils, upper sheathing only and 2—5 cm. long. Inflorescence laxly 1—6-flowered, secund. Bract entirely herbaceous, obtuse or shortly acute, about 2 cm. long. Bracteoles similar to bract. Perianth-tube cylindrical, widening very slightly towards throat, 1·4 cm. long; segments nearly equal, all with minute apiculus, arising slightly obliquely from perianth-tube so that 3 upper shortly exceed 3 lower in length, 3 upper 1·9—2 cm. long, 3 lower 1·8 cm. long, 3 outer ovate, obtuse, 9 mm. broad, 3 inner 1·2 cm. broad, slightly emarginate. Stamens arising shortly below throat of perianth-tube, equally divaricating or all arranged to one side; filament 8 mm., anther basifixed, 6 mm. long. Style straight, branches just short of or reaching top of anthers, slightly flattened and ciliate along margins, 3 mm. long. Ovary 4·5 mm. long, 2 mm. diam. Capsule 2·3—2·6 cm. long, outer wall membranous, 1 cm. across, inner walls firm. Seed 1·5—2 mm. diam., in centre of a broad, membranous, brown wing, about 1·2 cm. long, 8 mm. broad.

Knysna Div.—Groote River, J. Phillips 1201 (B.H.)! Port Elizabeth, Holland (without no., B.H.)! East London, Buffalo River, Murray, S.A.M. 21116! Bats Cave, Rattray, Muir 4534 (N.H.)! Near Gonubie River, Carter, N.B.G. 2375/30 (B.H.)! Bathurst Div., Kowie West, Tyson (without no. in B.H.)! Kentani, Pegler 817 (B.H. and N.H.)! Kei Mouth, Flanagan 2373 (B.H.)! Port Alfred, Tyson, Marloth no. 8512 (N.H.)! Port Shepstone, Mogg, N.H. 13953! Natal, Isipingo, Wood 9103 (B.H. and S.A.M.)! Durban, Wood 1092 (S.A.M.)! Umgeni River Mouth, Stainbank 55 (S.A.M.)!

(14) *A. ixioides* Baker, Handbk. Irid. 188, Fl. Cap. VI, 134.

I do not know this species. The description is inadequate and the type specimen, the only one quoted, is without locality. It might possibly be *Engysiphon brevitubus*, but according to Baker's description the perianth-tube is too short for that species. It might also be a *Gladiolus* related to *Gladiolus sabulosus*, and for the present, since the name must be changed, I propose calling it **Gladiolus ixioides** (Baker) Lewis comb. nov. Examination of the type is necessary. The type is Elliot 1174.

(15) *A. Fourcadei* L. Bolus in Ann. Bolus Herb. IV, 118, (1928).

From the description and dried material examined I have come to the conclusion that this species belongs to the genus *Geissorhiza* rather than *Engysiphon*. The bract and bracteoles are the same length, the stamens symmetrically arranged and the anther, which is up to 1·2 cm. long, as long as the filament. It is a distinct species, differing from all other species of *Geissorhiza* in the inflorescence. In many cases the plant is single-flowered, but in those plants which have 2 or sometimes 3 flowers, the lower flowers, instead of being sessile on the main axis, are borne singly at the apex of a short branch. It also differs from most species of *Geissorhiza* in the length of the bract, which is up to 2 cm. long, and the flower, which is very large for this genus. The name should now become **Geissorhiza Fourcadei** (L. Bolus) Lewis comb. nov.

(16) *A. Muirii* L. Bolus in Ann. Bolus Herb. Vol. 1, 195, (1915).

This is a *Hesperantha* and should be **Hesperantha Muirii** (L. Bolus) Lewis comb. nov. Examination of the type material shows that there is a certain amount of variation in the length of the style branches. In some of the type specimens the style branches arise at the throat of the perianth-tube and are up to 1·5 cm. long, while in others the style is exserted a few mm. from the perianth-tube and the branches are 8—10mm. long. The corm is more or less conical in shape, flat at the base, and has hard, woody, compact fibres arranged in vertical ridges so that it is slightly angled. This matches the corm of some *Hesperantha* species very well and the characters mentioned above are not observed in any other genus. The leaves and somewhat membranous bract also agree with those of *Hesperantha*. Considering these points, it seems that this species is best placed in this genus, the style-branches, corm and bract excluding it from all the others.

In the description the seeds were described as "winged." Examination of them shows that the seed, which is sharply angled when immature, has a very short projection at the angles which can scarcely be called a wing, and, as far as can be seen, there is a tendency for this to disappear in the mature seed.

Hesperantha Muirii var. robusta Lewis var. nov.

A typo planta robustiore, inflorescentia pluribus floribus et quod sciam ramulis styli semper apice perianthi tubi exstitutis differt.

The plant is more robust than the type, there are more flowers in the inflorescence, and, as far as can be seen from specimens examined, the style branches always arise at the throat of the perianth-tube.

Corm up to 1·5 cm. diam., conical, flat at base, tunics arranged in rows, splitting upwards from base. Basal leaves 3 or 4, about 5·5 cm. long, 3 mm. broad ; cauline 3 or 4, closly sheathing and entirely enclosing stem. Plant about 20 cm. high. Inflorescence compact, 3—6-flowered, usually 4 or 5-flowered.

Riversdale Div.—Plattekop Farm, 3 or 4 miles from Riversdale, Mrs. Ferguson, B.H. 19966 ! near Riversdale, Schlechter 1819 (N.H.) !

III. THE NEW GENUS THEREIANTHUS.

THEREIANTHUS Lewis gen. nov.

Gladiolus Linn. Sp. Pl. 37 (1753) party, Thunb. Diss. Glad. 15 (1784) and Fl. Cap. 194 (1811) partly. *Beilia* Eckl. Top Verz. 43 (1827) nomen nudum. *Watsonia* Ker in Kon. and Sims Ann. 1, 229 (1805) partly, not of Miller. *Watsonia* subgenus *Beilia* Klatt Erganz. 19 (1882) . Baker Fl. Cap. VI, 99 (1896).

Cormus globusus raro cylindricus, fibris tunicarum rigidis lignosis, regulariter parallelis. Folium radicale unicum lineare vel teres, rigidum, caule brevius ; folia caulina 3—4 vaginantia vel semivaginantia. Bractea papillosorum, bracteola similis vel apice solum bifida longior. Spica compacta vel laxa floribus erectis spiraliter dispositis. Tubus perianthii rectus raro paullo curvatus, cylindricus; segmentis patentibus aequilongis. Stamina sub apice tubi inserta erecta. Rami styli bifidi recurvati.

The name **Thereianthus** is derived from the Greek *thereios* = summer or belonging to summer and *anthos* = a flower.

The plants, which flower from November to January, are found in sandy places on the lower mountain slopes and plateaux. The various species are distributed, usually very locally, along the coastal region of the Western Province, extending from the Clanwilliam, Piquetberg and Ceres Divisions to Riversdale Division in the east. It is possible that these boundaries might be extended and that one or two additional species exist, but as they flower in the middle of summer, a season when not very much extensive collecting has been done, this genus has probably been rather neglected.

Corm globose, occasionally elongated and more or less cylindrical, seldom exceeding 1·5 cm. diam., usually less, situated shortly below ground surface. Tunics of hard, wavy, parallel fibres, or sometimes fine and reticulated. Stem usually simple, firm but fairly slender. Leaf 1 basal, linear or terete, firm, erect or curved, usually shorter than stem; 3 or 4 cauline, half or entirely sheathing, free part similar to basal leaf. Bract firm, frequently brown at time of flowering, not exceeding 1·5 cm. long, usually less. Bracteoles similar, completely fused or bifid at apex, usually shorter than bract. Inflorescence a compact or lax spike, flowers erect, spirally arranged. Perianth-tube straight or sometimes slightly curved, cylindrical; segments regularly arranged, equal, patent, recurving when fully mature. Stamens inserted just below throat of perianth-tube, symmetrically arranged or arranged to one side and slightly arcuate. Style branches bifid, recurved.

Ecklon, in Top. Verz. 43 (1827), removed two species from the genus *Gladiolus*, namely *G. spicatus* Linn. and *G.* [illegible] Thunb. and placed them in a separate genus *Bellia*, but gave no description of the genus or the species. In Konig and Sims Ann. 1, 229 (1805) Ker described as a new species *Watsonia punctata*, which most probably is a narrow-leafed form of Linné's *Gladiolus spicatus*. Klatt in Ergänz. 19 (1882) made *Bellia* a subgenus of *Watsonia* and added three or four species to this group, describing them under the name *Watsonia*, and one species which he wrongly placed in a different genus, *Anomatheca*. (The type of *Anomatheca* is *A. juncea* Ker which, with one or two additional species, is at present placed in the subgenus *Anomatheca* of the genus *Lapeyrousia*, according to Baker in Fl. Cap. VI. 89.) Baker followed Klatt in placing *Bellia*, with only a line of vague description, as a subgenus of *Watsonia*

(Fl. Cap. VI, 99, 1896), and placed in this subgenus 4 species and 2 varieties (also 1 doubtful species which does not belong here), including as synonyms *Beilia spicata* and *B. triticea* of Ecklon. In so doing Klatt and Baker have used the name *Beilia* in a different sense from Ecklon, and, in addition, there is no adequate description. In view of the above facts I consider that it is best to regard the name *Beilia* as a nomen nudum, and, as a name must be given to this genus which is distinct from *Watsonia*, I propose the name *Thereianthus*.

This genus forms a link between *Watsonia* and *Micranthus*. From the latter genus it differs in having a straight or nearly straight perianth-tube and in not having a very dense, many-flowered, two-ranked inflorescence. There are several points in which this genus differs from *Watsonia*, apart from the size of the plants, the much smaller flowers, stem leaves and corm. In *Watsonia*, with possibly one or two exceptions only, the perianth-tube is always curved and consists of two portions, the narrow cylindrical part at the base and the upper portion which is broadly cylindrical or funnel-shaped, the upper part equalling or shortly exceeding the lower part in length. The stamens are attached to the perianth-tube at the junction of the basal and upper parts, that is, about half-way down. In *Thereianthus* the perianth-tube is nearly always straight and erect. In one of two species it curves a little and widens very slightly just below the throat, or it remains the same width throughout, but it cannot be divided into two distinct portions as in *Watsonia*. The perianth-segments are equal, regularly arranged, at first patent then recurving. The stamens are attached to the perianth-tube just below the throat and are arranged to one side, slightly declinate, or sometimes symmetrically arranged. In *Watsonia* the perianth-segments are sometimes regularly arranged and more or less patent, very seldom recurving as the flower matures, the 3 inner broader than the 3 outer. More often the upper perianth-segment is more or less hooded or arched. With only two exceptions the stamens are always arcuate, usually arranged under the hooded segment, but in some of the species with patent segments the stamens are inverted, arranged at the lower side of the flower and facing the upper perianth-segment. *Thereianthus* has only 1 basal leaf which clasps the stem at the base, whereas with one or two exceptions, there are 2, 3 or 4 basal leaves in *Watsonia*, distichously arranged.

Thereianthus is also fairly closely allied to *Lapeyrousia*, from which it differs in its corm, which is globose, not flattened at the base, surrounded by firm or wiry fibres, which are parallel or reticulate, sometimes extending upwards to form a short neck. In two of the subgenera of *Lapeyrousia* the corm is conical in shape, flattened at the base, the tunics of firm fibres, which are usually fused together. (The third subgenus, *Anoma-*

theca, is distinct in having 2—6 basal leaves in a distichous rosette and an entirely different corm.) In addition, *Thereianthus* differs in its inflorescence, which is a simple, erect spike, whereas in *Lapeyrousia* the inflorescence is sometimes a congested, short, branched one, forming a rosette, or the stem is elongated but nearly always much branched.

KEY TO SPECIES.

- Perianth-tube very short, included in bract .. *racemosus* (1)
- Perianth-tube exserted from bract, not very short.
  - Inflorescence lax; bracts not imbricating .. *juncifolius* (2)
  - Inflorescence compact to dense; bracts slightly to distinctly imbricating.
    - Perianth-segments much shorter then perianth-tube.
      - Basal leaf linear, occasionally lanceolate, falcate .. .. *lapeyrousioides* (3)
      - Basal leaf terete. erect.
        - Perianth-tube much longer than segments .. .. *longicollis* (4)
        - Perianth-tube shortly exceeding segments .. .. *spicatus var. linearifolius* (5)
    - Perianth-segments as long as or longer than perianth-tube, occasionally slightly shorter.
      - Leaf linear, veins prominent .. .. *spicatus* (5)
      - Leaf terete or very narrow-linear, veins not distinct nor prominent.
        - Perianth-tube extremely narrow throughout, not widening at all; flower white .. .. .. *ixioides* (6)
        - Perianth-tube dilating slightly towards throat; flower blue or purple.
          - Leaf terete, veins not or scarcely visible; 3—6 well-marked parallel veins running from base to apex of perianth-segments .. .. *bracteolatus* (7)
          - Leaf very narrow-linear, veins visible, fairly distinct; veins on perianth-segments about 3 parallel, others spreading side and upwards from them .. *spicatus var. linearifolius* (5)

(1) **T. racemosus** (Klatt) Lewis comb. nov.

Watsonia racemosa Klatt, Erganz. 20 (1882). The type collecting of this species is Zeyher 1609 (Co-types in S.A.M. and B.H.). Klatt gives as a synonym *Ixia maculata* var. *minor* Andr. Bot. Rep. t. 256, which is not the same as Zeyher 1609, but is very definitely an *Ixia*. In Fl. Cap. VI. 181 (1896) Baker quotes *W. racemosa* Klatt as a synonym of *Ixia columellaris*, and on p. 104 quotes Zeyher 1609 and no other specimen under *W. minuta* Klatt. In his description of *W. minuta* (Erganz. 19) Klatt makes no reference to Zeyher 1609 (which, as already stated, he quotes under *W. racemosa*), the only numbers given being Eck. and Zey. 189 and Drege 1551. It seems fairly clear that Baker has confused

W. minuta Klatt and *W. racemosa* Klatt. Omitting the reference to *Ixia* (Andr. Bot. Rep. t. 256) the correct name should therefore be *W. racemosa* Klatt, his description agreeing with the type specimens quoted, Zeyher 1609.

In the Bolus Herbarium there are seven specimens belonging to the species collected by Miss Edwards near Porterville, three of which bear short branches near the top of the stem. All other specimens seen are unbranched.

Corm globose, about 1 cm. diam., tunics of fine, netted fibres, parallel near base. Stem 15—25 cm. high, slender, 1—1·5 mm. diam., simple or bearing a short branch near apex. Basal sheaths 2, obtuse, brown, membranous, upper not exceeding 2·8 cm. long. Leaf falcate, fused round stem for one-third its length, linear, acute, 10—16 cm. long, up to 3 mm. broad, mid-rib and margins raised ; 3 or 4 cauline, closely sheathing for half their length, apex acuminate. Inflorescence compact, 5—25-flowered. Bract membranous, brown, shortly acute or obtuse, about 4 mm. long. Bracteoles membranous, colourless, free at apex. Perianth-tube included in bract, 1 mm. long ; segments 8 mm. long, 3—4 mm. broad. Stamens with filaments 3 mm. long, anthers 3 mm. long. Style reaching top of filaments, branches short.

Piquetberg Div.—Zeyher 1609 (co-types in S.A.M. and B.H.) ! near Porterville, Miss Edwards, B.H. 13367 !

(2) **T. juncifolius** (Baker) Lewis comb. nov.

Morphixia juncifolia Baker in Journ. Bot. (1876) 238 ; Journ. Linn. Soc. XVI, 98 (1877). *Anomatheca calamifolia* Klatt in Erganz. 21 (1882). *Watsonia juncifolia* Baker, Fl. Cap. VI, 105 (1896).

The type and only collecting quoted by Baker is Zeyher 1619 from Piquetberg Div. Klatt, under his description of *Anomatheca calamifolia*, gives *Morphixia juncifolia* as a synonym and quotes as the only collecting Drège 1619. In the same publication, Erganz, p. 19, he quotes Drège 1619 under *Watsonia subulata*. Klatt has probably made a mistake and the collector of the type of *T. juncifolius* is Zeyher, no. 1619.

Corm about 1 cm. diam., globose or somewhat elongated ; fibres fine, extending upwards to form a short neck. Stem very slender, simple or occasionally bearing 1 or 2 short branches, 1 mm. or less in diam., 30—35 cm. high. Basal sheaths 2, outer obtuse, inner acuminate, soft in texture, not always persistent. Leaf filiform, very slender, often overtopping inflorescence, fused round stem for short portion at base only, 15—50 cm. long, less than 1 mm. diam., cauline 2 or 3, when 3 the lowest resembling basal leaf but much shorter, other 2 reduced to short sheaths, 3 cm.—3 mm. long. Inflorescence lax, 2—10-

flowered, bracts not imbricating. Bract soft, membranous, acute or obtuse, 5 mm. or less long. Bracteoles like bract, slightly longer, completely fused. Perianth-tube well exserted 1·1—2 cm. long, widening slightly towards throat; segments shorter than tube, up to 1 cm. long, 6 mm. broad. Stamens—filaments 3—4 mm. long, anthers 4 mm. long. Style reaching top of anther, branches overtopping anthers.

Caledon Div.—Hottentot Holland Mtns., Zeyher 1619 (S.A.M.)! near Pringle Bay, Pillans 8185 (B.H.)! Tulbagh Div. Twenty-four Rivers, Zeyher 1619 (S.A.M.)! Cold Bokkeveld, Skurfdeberg, near Wagebooms Rivier, Schlechter 10169 (B.H.)! near Porterville, Edwards, B.H. 13447 and 16150!

(3) **T. lapeyrousioides** (Baker) Lewis comb. nov.

Watsonia lapeyrousioides Baker, Handbk. Irid. 178 (1892); Fl. Cap· VI, 105 (1896). *Anomatheca juncea* Herb. Drège, non Ker.

Corm 1 cm. or less in diam., tunics of fine netted fibres. Plant 10—30 cm. high; stem simple, slender, about 1 mm. diam. Leaf falcate, lanceolate, acute, often linear, mid-rib and margins somewhat raised, 4—22 cm. long, up to 6 mm. broad; cauline 2—3, lowest resembling basal, upper short, sheathing. Inflorescence fairly compact, bracts just imbricating, 4—14-flowered. Bract obtuse or acute, soft, 6—8 mm. long. Bracteoles nearly colourless, shorter than bract. Perianth-tube well exserted, slender, dilating slightly towards throat, 2—3 cm. long; segments oblong, obtuse, 8 mm. long, 4 mm. broad. Stamens with filaments 4 mm., anthers 3 mm. long. Style just exserted from throat of perianth-tube, branches shorter than stamens.

Paarl Div.—Bains Kloof, Schlechter 9126 (B.H.)! L. Bolus, B.H. 22439! Carter, B.H. 22438! Grant 2648 (B.H.)! Wellington, Joubert, N.B.G. 2630/29 (B.H.)! Witte River Valley, Thorne, S.A.M. 46562! Worcester Div., Du Toits Kloof, Bolus, B.H. 5497! between Villiersdorp and French Hoek, Bolus B.H. 5251! Tulbagh Div., Tulbagh Waterfall, E. & L. 189 (S.A.M.)!

Var. elatior Lewis var. nov.

A forma typica planta altiora, 24—46 cm., foliis longioribus augustioribusque, inflorescentia longiore, floribus 14—36, bracteis brevioribus, circa 5 mm. longis, differt.

Ceres Hills, Guthrie 2208 (type, in B.H.)! near Ceres, Bolus, B.H. 8342! Leslie, N.B.G. 46/32 (B.H.)!

Plant taller than in typical form, 24—46 cm. high. Leaf somewhat longer and narrower. Inflorescence longer, 14—36-flowered. Bracts shorter, about 5 mm. long.

(4) **T. longicollis** (Schltr.) Lewis comb. nov.

Watsonia longicollis Schltr. in Engl. Bot. Jahrb. Vol 27 (1900), p. 106. *W. punctata* Ker var. *longicollis* Baker Handbk. Irid. 177 (1892); Fl. Cap. VI, 104 (1896).

Plant slender, 15—25 cm. high. Corm ovoid, tunics of netted fibres, thickened at base, ending in stiff bristles at apex. Leaf 1 basal, 2 cauline, erect or spreading slightly, firm, filiform, compressed, lowest not overtopping flowers, uppermost shorter, scarcely reaching middle of inflorescence. Inflorescence many-flowered. Bract firm, oblong, acute or acuminate, veined, 1—1·2 cm. long. Bracteoles bifid at apex, margins membranous, about as long as bract. Perianth-tube slender, elongated, filiform, cylindrical, dilating towards throat, 2·5—3·3 cm. long; segments oblong, shortly apiculate, 1·3 cm. long, about 5 mm. broad. Stamens with anther linear, 6 mm. long. Style branches 5 mm. long, just overtopping anthers.

Tulbagh Div., near Waterfall, alt. 1,200 ft., Schlechter 9155 (type, co-type in B.H.)! Zeyher 445 (B.H.)! Porterville, Edwards 80 (B.H.)!

(5) **T. spicatus** (Linn) Lewis comb. nov.

Gladiolus spicatus Linn. Sp. Pl. 37 (1753); Thunb. Diss. Glad. 15 (1784). *Watsonia punctata* Ker, Kon. and Sims Ann. 1. 229 (1805); Gen. Irid. 124 (1827); Klatt Erganz. 19 (1882); Baker, Handbk. Irid. 177 (1892) partly; Fl. Cap. VI, 104 (1896) partly. *Beilia spicata* Eckl. Top. Verz. 43 (1827) nomen nud. *?Gladiolus rubens* Vahl. Enum. 11. 98 (1806). *?Watsonia rubens* Ker. Gen. Irid. 124 (1827).

Plant about 30 cm. high; stem fairly sturdy, up to 4 mm. diam., leaf firm, flat, linear, acute, veins prominent, nearly always brown at time of flowering, about 20 cm. long, up to 6 mm. broad; cauline 3, almost entirely sheathing stem, free part like basal leaf, lowest usually brown, others green, 19·5, 13 and 7 cm. long. Inflorescence dense, many-flowered. Bract firm, brown, acute, 1·3 cm. long, 6 mm. broad. Bracteoles 1·1 cm. long. Flowers pale blue or purple, 3 lower segments usually marked with deeper blue and white; perianth-tube straight or slightly curved just below throat, about 1·2 cm. long; segments linear-oblong, obtuse or shortly acute, 3 parallel veins from base to apex, other veins spreading sideways and upwards, not very distinct, 1·5 cm. long, 5 mm. broad. Stamens with filaments 4 mm., anthers 5 mm. long. Style reaching half way up anthers, branches 3 mm long, spreading between anthers.

Cape Peninsula.—Table Mtn., Pappe, S.A.M. 21072! Paarl Div.—Paarl Mt., Grant 5027 (B.H.)! Stellenbosch Div.—Somerset West, Mart-

ley, B.H. 22440! Caledon Div. near Sir Lowry's Pass, Bolus B.H. 4210! Hottentot Holland Mtns., Pappe, S.A.M. 21069!

T, spicatus var. linearifolius Lewis var. nov.

Folia longiora, augustissima, linearia vel raro subteretia, firma, nervis sat prominentibus. Flores quam typicas aliquando minores; tubo perianthii segmentis aequilongo vel longiore.

French Hoek Div.—mtns. near French Hoek, Salter 2973 (type, in B.H.)! mtns. north of French Hoek Pass, Pillans 7624 (B.H.)! Tulbagh Div., Tulbagh, Pappe, S.A.M. 21070! E. and Z. 188 (S.A.M.)! Pappe, S.A.M. 48544! Caledon Div., near mouth of Palmiet River, Salter 5180 (B.H.)!

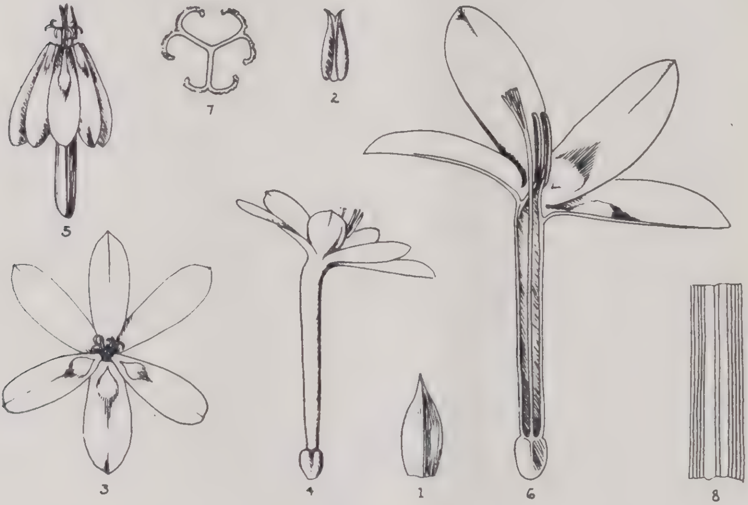


FIG. 1. *Thereianthus spicatus.* 1. Bract × 1. 2. Bracteoles × 1. 3. Young flower × 1. 4. Young flower, side view × 1. 5. Old flower × 1. 6. Flower, half-section × 2. 7. Style branches × 2. 8. Portion of leaf × 2.

Leaves longer, very narrow, linear to subterete, firm, veins fairly prominent. Flowers sometimes smaller than in typical species, perianth-tube equalling or longer than segments.

The description of *T. spicatus* given above is of a plant which I take to be the same as *Gladiolus spicatus* of Linn. and Thunb. I have not seen their types, but Dr. N. E. Brown has made the following comment about Thunberg's type sheet in the Journ. of Linn. Soc. XLVIII, 31 (1928): " A species of *Watsonia*. This is considered by Baker and Klatt to be

Watsonia punctata Ker, but it seems to differ in having flat leaves." Thunberg described the flowers as blue, bracts lanceolate, acute, and distinguished it from *Gladiolus triticeus* (*T. bracteolatus*) by its broader leaves and acute bract.

According to Baker in Fl. Cap. VI, 98 (1896), Ker has misunderstood *Gladiolus spicatus* Linn. and has given the name *Watsonia spicata* (Ker. in Kon. and Sims Ann. 1. 229 (1805); Gen. Irid. 123 (1827), which he incorrectly based on *Gladiolus spicatus* Linn., to the plant which is now known as *Micranthus tubulosus* N.E. Br. (= *M. fistulosus* Eck. Top. Verz. 44 (1827). Ker then described as a new species *Watsonia punctata* (Ker, Kon. and Sims Ann. 1, 229 (1805) and this most probably is a narrow-leaf form of Linné's *Gladiolus spicatus*, possibly even the plant which I have named *T. spicatus var. linearifolius*. In *T. spicatus* considerable variation in the width of the leaf is found, from 2—6 mm. It is, however, always flat, the veins prominent, although in the variety the leaf is sometimes terete.

I have not, unfortunately, seen Ker's description nor Linné's type, so am unable to confirm the above.

(6) **T. ixioides** Lewis sp. nov.

Cormus 1·5 cm. diam., tunicis e fibris fortibus, supra crassis, reticulatis, infra parallelis, compositis. Planta 25—45 cm. alta, caule simplice, gracile. Folium teres; folia caulina 3 vel 4, semivaginantia, supremum 1 cm. vel ultra. Spica compacta, 6—7-flora. Bractea basi herbacea, superne brunnea, obtusa vel acuta, bracteis superioribus amplexis. Bracteolae coalitae apice liberae. Tubus perianthii e bractea exsertus, rectus, gracillimus, 1—1·2 cm. longus, apice circa 1 mm. diam., segmentis aequalibus, acutis. Staminum filamenta 3 mm., antherae 6 mm. Stylus ad basum antherarum attingens, ramulis sat longis, bene curvatis.

Paarl Div.—Summit of Bains Kloof, Salter 5117 (type, in B.H.)! Grant 2644 (B.H.)! Worcester Div., Du Toits Kloof, Tyson 904 (S.A.M.)!

The flowers are pure white or the 3 lower perianth-segments have a round, bluish-mauve spot near the base and blue anthers. This species is distinct in having a perianth-tube which is filiform, cylindrical throughout, very slender, the flower closely resembling the flower of some species of *Ixia*.

Corm 1·5 cm. diam., tunics of strong, wiry fibres, coarsely reticulate above, parallel below. Plant 25—45 cm. high, stem simple, slender and wiry, about 1·5 mm. diam. Leaf fused round stem at base, terete, 22—45 cm. long, 1—1·5 mm. diam.; cauline 3 or 4, sheathing for half this length, uppermost sometimes 1 cm. long. Inflorescence compact, 6 or 7-flowered. Bract herbaceous at base, brown above, obtuse or acute, 7—11 mm. long, overlapping bract above. Bracteoles free at apex, much shorter. Perianth-tube exserted from bract, straight, very slender, 1—1·2 cm. long, 1 mm. or less diam. at throat ; segments equal, acute, 1·2 cm. long, 5 mm. broad. Stamens with filaments 3 mm., anthers 6 mm. long. Style reaching top of filaments, branches fairly long, well curved.

(7) **T. bracteolatus** (Lam.) Lewis comb. nov.

Gladiolus bracteolatus Lam. Encycl. Method. II 725 (1786). *Gladiolus subulatus* Vahl. Enum. 11, 99 (1806). *Watsonia subulata* Klatt Erganz. 19 (1882). *Gladiolus triticeus* Thunb. Fl. Cap. 1, 194 (1811). *Beilia triticea* Eckl. Top. Verz. 43 (1827) nomen nudum. *Watsonia punctata* Ker var. *triticea* Baker, Handbk. Irid. 177 (1892) ; Fl. Cap. VI, 104 (1896).

Corm globose or cylindrical, about 1·5 cm. diam., tunics of hard, woody fibres. Plant 17—25 cm. high. Leaf brown at time of flowering, terete, firm, veins scarcely visible, about 15 cm. long, 1 mm. diam. ; 3 cauline, half sheathing, upper half terete. Inflorescence 7—14-flowered. Bract firm, brown, sometimes obtuse, usually shortly acute, 9 mm. long, 5 mm. broad. Bracteoles completely fused, 8 mm. long. Perianth-tube exserted slightly from bract, straight or slightly curved, erect, dilating slightly towards throat, segments oblong, obtuse, 1·5 cm. long, 6 mm. broad. Stamens with filaments 1 cm. long, anthers 4—5 mm. Style reaching top of anthers, branches overtopping stamens.

Cape Peninsula.—Camps Bay, Zeyher 5038 (S.A.M.) ! Table Mt., half way down Constantia Nek, Gillett 3365 (B.H.) ! Muizenberg Mt., Bolus B.H. 3305 ! Vlaggeberg, Dod 345 (B.H.) ! Redhill, Penfold, N.B.G. 2465/31 (B.H.) ! Tulbagh Div.—Twenty-four Rivers, Zeyher 1608 (S.A.M.) ! Clanwilliam Div.—near Elands Kloof, Schlechter 9765 (B.H.) ! Caledon Div.—Palmiet River, near Grabouw, Bolus, B.H. 3305 ! btn. Caledon and Hermanus, Barnard, B.H. 22441 ! Bredasdorp Div., plateau on mountain top near Bredasdorp, Galpin, B.H. 22440 !

A form which seems to belong here is Barnard (S.A.M. 27385) from Zonder Einde Mts. This has a longer perianth-tube, up to 1·5 cm. long, and shorter segments, otherwise it agrees very well with the above description.

I have not seen Lamarck's type (*Gladiolus bracteolatus*), but from his description, which is a fairly detailed one, I am in no doubt that it is the same as those quoted as synonyms above, and that his specific name should therefore be given to the species.

The flowers are bright purple, each segment marked with deeper purple, the 3—5 more or less parallel veins running from base to apex distinct, in living and dried flowers. This species, which has frequently been confused with *T. spicatus*, is distinct in having terete leaves, the veins scarcely visible, the bract shorter and more or less obtuse, and the veining on the perianth-segments well marked.

(*Doubtful Species.*) **T. minutus** (Klatt) Lewis comb. nov.
Watsonia minuta Klatt, Erganz. 19.

According to Klatt's description the leaves are linear-lanceolate, about 3 mm. broad. Stem about 15 cm. high. Bract 4 mm. Inflorescence 2·5—5 cm. long, densely flowered. Flowers purple : perianth-tube 4 mm. long ; segments 4 mm. long.

Worcester, Waterfall, E. & Z. no. 189. Du Toit's Kloof mountain and waterfall, Drège 1551, Herb. Lubeck.

I do not know this species, which seems very near *T. racemosus*, but differs in having a longer perianth-tube and shorter segments. Baker has confused this species with *T. racemosus* (see note under that species).

IV. Various New Species of Iridaceae.

Romulea longituba Lewis sp. nov.

Cormus ignotus. Folia 3 vel 4, filiformia, flores superantia, 1 mm. vel minus diam. Pedicellus 3·4—4 cm. longus, sine pedunculo. Bractea angusta, herbacea, acuminata, 4—6 cm. longa. Bracteolae omnino coalitae, bracteae similes. Perianthium probabiliter flavum, tubo gracillimo, 5·5—6·5 cm. longo, cylindrico sed circa 1 cm. ad apicem infundibuliforme ; segmentis breviter acutis, 3—3·5 cm. longis, 6—9 mm. latis. Stamina ad tubum perianthii breviter infra apicem adnata. Stylus ad apicem antherarum non attingens.

Griqualand East, in graminosis summi montis Ingeli, Tyson 1267 (type, in S.A.M.)! Flores Martis.

This distinct species differs from the common type of *Romulea* in having a very much longer, cylindrical perianth-tube, which is funnel-shaped at the apex only. In the great majority of species of *Romulea* the perianth-tube is short, nearly always under 1 cm. in length, and funnel-shaped. *Romulea MacOwani* (Baker) from the Somerset East Division, forms a link between the common form and *R. longituba*. Baker, in his description, says that the perianth-tube is up to ¾ inch (about 2 cm.) long, but in material under the type number in the S.A.M. Herbarium one of the flowers has a perianth-tube 4 cm. long. The corm has a large, flattened base.

R. longituba is undoubtedly very closely related to *L. MacOwani* and must, therefore, have the same type of corm.

Corm not seen. Leaves 3 or 4, filiform, overtopping flowers, up to 28·5 cm. long, 1 mm. or less in diam. Pedicel 3·4—4 cm. long; no peduncle present. Bract narrow, acuminate, herbaceous, 4—6 cm. long. Bracteoles completely fused, exactly like bract. Perianth probably yellow; tube very slender, cylindrical except 1 cm. towards throat, which is funnel-shaped, 5·5—6·5 cm. long; segments shortly acute, 3—3·5 cm. long, 6—9 mm. broad. Stamens attached to perianth-tube shortly below throat, filament 5 mm., anther 8 mm. long. Style not reaching top of anthers.

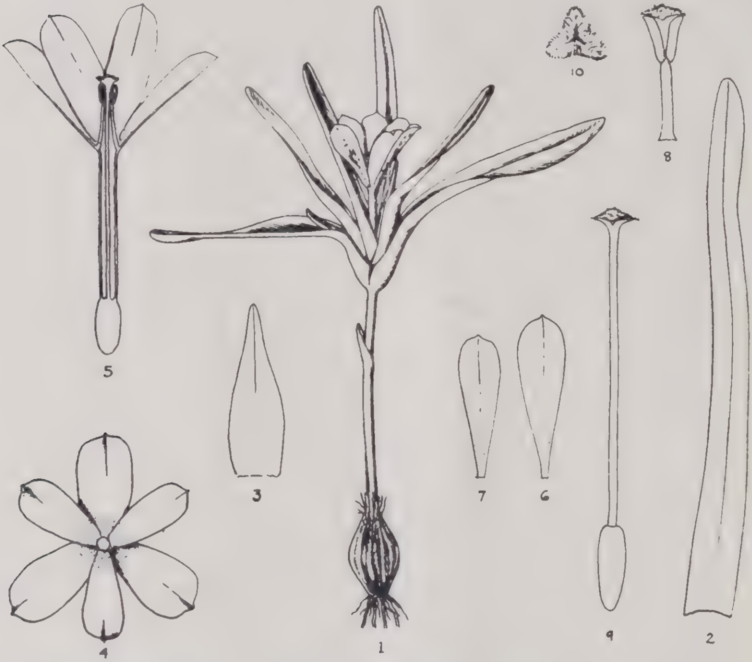


FIG. 2. *Galaxia albiflora*. 1. Plant × 1. 2. Bract × 2. 3. Bracteoles × 2. 4. Flower × 2. 5. Flower, half-section × 2. 6. Outer perianth segment × 2. 7. Inner perianth segment × 2. 8. Stamens and stigma × 3. 9. Gynaecium × 3. 10. Stigma × 4.

Galaxia albiflora Lewis sp. nov.

Planta ad 9 cm. alta (cormo incluso), parte supra terram 4 cm. vel minus. Cormus globosus, tunicis e fibris crassis, rugosis, rigidis compositis. Vagina basalis 1, sine pigmento. Folia 2, caulina, breviter lanceolata, acuta vel obtusa, firma, nitida, divaricata, glabra vel marginibus minute ciliatis, ad 4·5 cm. longa, 6 mm. lata. Bractea erecta, foliis similis sed angustior, 4 cm. longa, 4 mm. lata. Bracteolae membranaceae totius herbaceae, acutae. Perianthium parvulum, circa 1 cm. diam., album, tubo apice luteo, segmentis exterioribus externe caeruleo-viridibus laeviter puniceo virgatis; tubo 1·1 cm. longo; segmentis obtusis, minute mucronatis, exterioribus 1 cm. longis, 4 mm. latis, interioribus 9 mm. longis, 3 mm. latis. Stamina:—filamentis 4 mm., antheris erectis, ad stylum adpressis, 1·5 mm. longis. Stylus antheras paulo superans, stigmatis lobis complanatis, ciliatis. Ovarium 4 mm. longum.

Cape Peninsula, Rondebosch Common, Lewis, S.A.M. 54289 (type)! Blaauwberg, Pillans, B.H. 18564! Malmesbury Div., Langebaan, Lewis, B.H. 20704!

Flowers July—August.

The flowers of all *Galaxias* are fugitive, lasting only a few hours and only opening on sunny days during the winter and early spring. This small-flowered species seems to be even more fugitive than usual, the flowers, as far as I have been able to see, remaining open for only about four hours during the hottest part of the day. As only one flower is produced to each bract and bright sunshine is essential, several days might elapse between the opening of two flowers on one plant during unfavourable weather. It is possible that this inconspicuous species, which has been found growing with *Galaxia fugacissima* (*graminea*) on flat, open ground, might be less rare than it at present appears to be. Very few specimens have been collected, but it is possible that, as the flowers are so small and fugacious, this species has been overlooked.

Plant up to 9 cm. high (corm included), only 4 cm. or less above ground. Corm spherical, 8 mm. diam., tunics of coarse, vertically ridged fibres. Basal sheath 1, colourless, 2—3 cm. long. Leaves 2 cauline, shortly lanceolate, acute or obtuse, firm, shiny glabrous or minutely ciliate, spreading, up to 4·5 cm. long, 6 mm. broad. Bract like leaf but erect, narrower, 4 cm. long, 4 mm. broad. Bracteoles membranous, herbaceous at apex only, acute, 1·3 cm. long, 4 mm. broad. Flower very small, about 1·5 cm. diam. when fully open, white, yellow at throat, outer segments bluish-green streaked with red on outside; perianth-tube, 1·1 cm. long; segments obtuse, minutely mucronate, outer 1 cm. long, 4 mm. broad, inner 9 mm. long, 3 mm. broad. Stamens—filaments 4 mm., anthers erect, adpressed to style, 1·5 mm. long. Style reaching top of stamens, stigma just overtopping anthers, flattened, ciliate. Ovary 4 mm. long.

Geissorhiza umbrosa Lewis sp. nov.

Planta gracilis, diffusa vel erecta, caule simplice vel raro ramoso, fere flexuoso, 10—30 cm. alta. Cormus globosus, tunicis e fibris compactis, sat teneris, pallide brunneis, apice setosis brevibus, compositis. Folia 1 vel 2 basalia, anguste linearia, acuminata, prope subteretia, nervo medio marginibusque bene incrassatis, nervis alteris sat manifestis, fere brevia falcataque, sive longiora recta, 4—29 cm. longa ; caulina 1 vel 2, supremum brevissimum, vaginantem, 2—2·5 cm. longum. Inflorescentia laxa, ad 6-flora, plerumque 1 vel 2-flora. Bractea truncata, apice membranacea, obtusa. Bracteolae omnino coalitae, bracteae similes. Tubus perianthii 4 mm. longus, segmentis exterioribus oblongis, obtusis, quam interiora leviter longioribus angustioribusque. Stamina ad apicem tubi adnata. Stylus staminas superans erectus vel raro curvatus, ramulis recurvatis, minute ciliatis, non ampliatis.

Cape Peninsula, top of Table Mtn., Lewis, S.A.M. 54288 (type) ! Bolus, B.H. 4985 and 4615 (B.H.) ! Orange Kloof, Dod 3365 (B.H.) !

This species is nearest *G. setifolia*, from which it differs in having slightly larger and fewer flowers in the inflorescence, the leaves usually falcate and narrow-linear, distinctly nerved, instead of terete, smooth and more or less filiform, the bract truncate, membranous at the apex only, instead of acute and almost entirely membranous. It seems to prefer damp rock ledges in the shade, in which habitat the plants are short, one or two-flowered and have spreading leaves. More robust specimens less frequently found growing in sunnier positions among other plants. These latter are taller and have erect leaves, the stem occasionally branched and have up to six flowers in the inflorescence.

Plant slender, sprawling or erect, stem simple or occasionally branched, often flexuose, 10—30 cm. high. Corm spherical, about 7 mm. diam., tunics of light brown, compact but fairly soft fibres, ending in short bristles. Leaves 1 or 2 basal, narrow-linear, acuminate, margins and mid-rib well raised, appearing subterete, veins distinct, frequently short and falcate, if longer than straight and erect, 4—29 cm. long ; 1 or 2 cauline, uppermost a short sheath only, 2—2·5 cm. long. Inflorescence up to 6-flowered, most often only 1 or 2-flowered. Bract truncate, membranous at apex, obtuse, about 6 mm. long and broad. Bracteoles completely fused, similar to bract. Flower white, perianth-tube pale green, outer segments pink or red outside ; tube 4 mm. long, segments oblong, obtuse, outer slightly longer and narrower than inner, about 1·2 cm. long, 5 mm. broad. Stamens attached to throat of perinath-tube, filaments 4 mm., anthers 3 mm. long. Style overtopping stamens, erect or sometimes curved, branches recurved, minutely ciliate, not flattened.

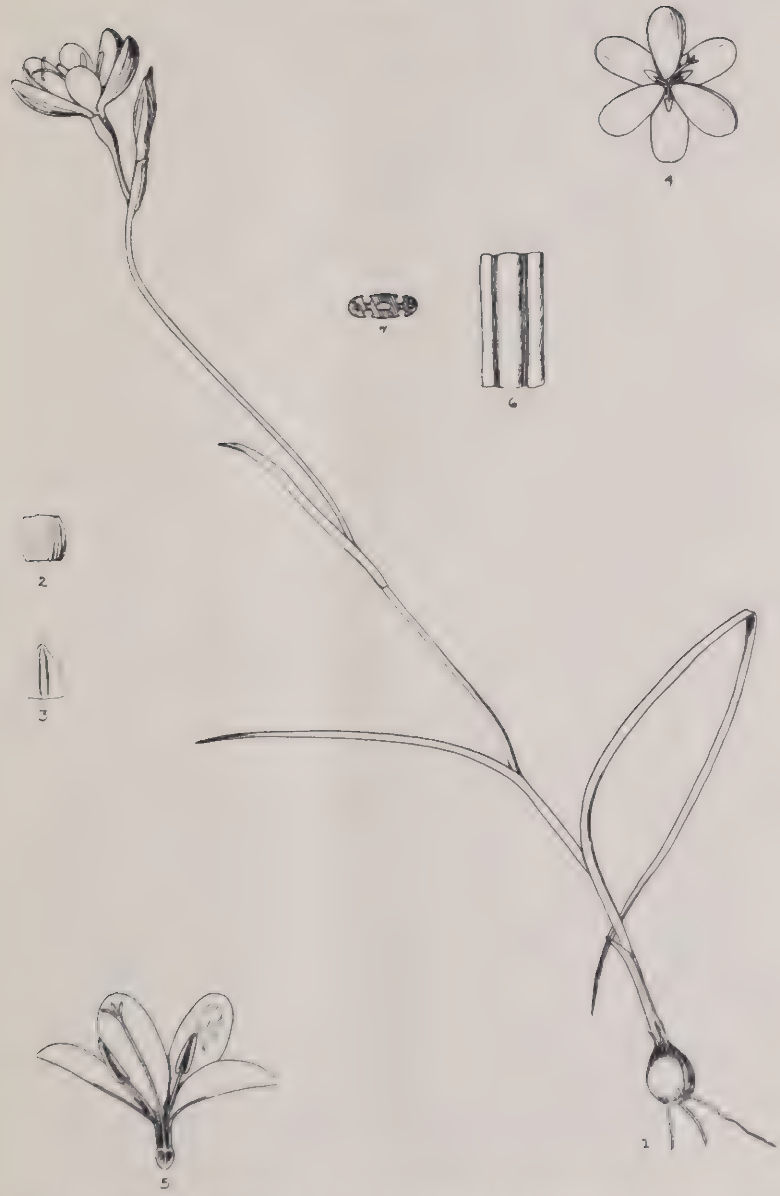


FIG. 3. *Geissorhiza umbrosa.* 1. Flowering plant × 1. 2. Bract × 1. 3. Bracteoles × 1. 4. Flower × 1. 5. Flower, half-section × 2. 6. Portion of leaf × 6. 7. Transverse section of leaf × 6.

Geissorhiza teretifolia Lewis sp. nov.

Cormus globosus, circa 1 cm. diam., fibris tunicarum rigidis, lignosis, imbricatis, e base aequaliter scissis. Planta 15—35 cm. alta, caule glabro, firmo, simplice vel ramis fere infra dimidiam exstitibus. Vagina basalis 1, acuminata. Folium basale 1, caulem superans, teres, sat carnosum, erectum, basi caulem vaginante, circa 1 mm. diam.; folia caulina 2, inferiorum 4—8 cm. supra basem caulis insertum, vagina 4—8 cm. longa, nervis numerosis sat promentibus, lamina terete, 11—23 cm. longa; superiorum simile sed multo brevior, semivaginans. Inflorescentia secunda, laxa, 2—8-flora. Bractea viridis, herbacea, apice membranacea mutata, acuta, tener. Bracteolae coalitae, bracteae similes. Perianthii tubus bracteae aequilongus; segmenta oblonga, breviter acuta vel obtusa, exteriora 1·7 cm. longa, 8 mm. lata. Stamina perianthii tubo 2 mm. infra apicem adnata. Stylus antheras superans, ramulis recurvatis. Ovarium ovoideum, 2 mm. longum, 2 mm. diam.

Cape Peninsula.—Ottery Road Station, Lewis S.A.M. 53097! Kenilworth Race Course, Lewis, S.A.M. 53064 (type)! Salter 7738 (B.H. and S.A.M.)! Worcester Div.—Hex River Valley, Mrs. Davidson no. 75 (S.A.M.)! near Brand Vlei, Lewis, B.H. 20414! Cape Peninsula, without precise locality, E. and Z. 427, partly (S.A.M.)!

In appearance this species resembles *G. imbricata*, but it differs from that and all other species in having terete, rather fleshy leaves. It is found growing in shallow water on the edges of seasonal marshes and pools. As far as I know it is the only species which actually grows in water. The flower is usually pure white, sometimes tinged with mauve outside.

Flowering season September—October.

Corm globose, about 1 cm. diam.; tunics of hard, compact, imbricating rows of fibres, evenly cut up from base. Plant 15—35 cm. high; stem glabrous, firm, simple or more often branches from below the middle. Basal sheath 1, acuminate, about 6 cm. long. Leaf 1 basal, overtopping stem, terete, somewhat fleshy, erect, sheathing stem at base, up to 35 cm. long, about 1·5 mm. diam.; 2 cauline, lower arising 4—8 cm. above base of stem, sheathing part 4—8 cm. long, many and closely veined, upper part terete, 11—23 cm. long; upper cauline similar to lower but much shorter, half sheathing, half free. Inflorescence secund, laxly 2—8-flowered. Bract green, herbaceous, becoming membranous in upper half as it dries, acute, soft, up to 1·5 cm. long. Bracteoles fused, same as bract. Perianth-tube just reaching top of bract. 5—6 mm. long; segments oblong, shortly acute or obtuse, outer 1·7 cm. long, 8 mm. broad, inner 1·6 cm. long, 9 mm. broad. Stamens attached to perianth-tube 2 mm. below throat, filaments 5 mm., anthers 5 mm. long. Style

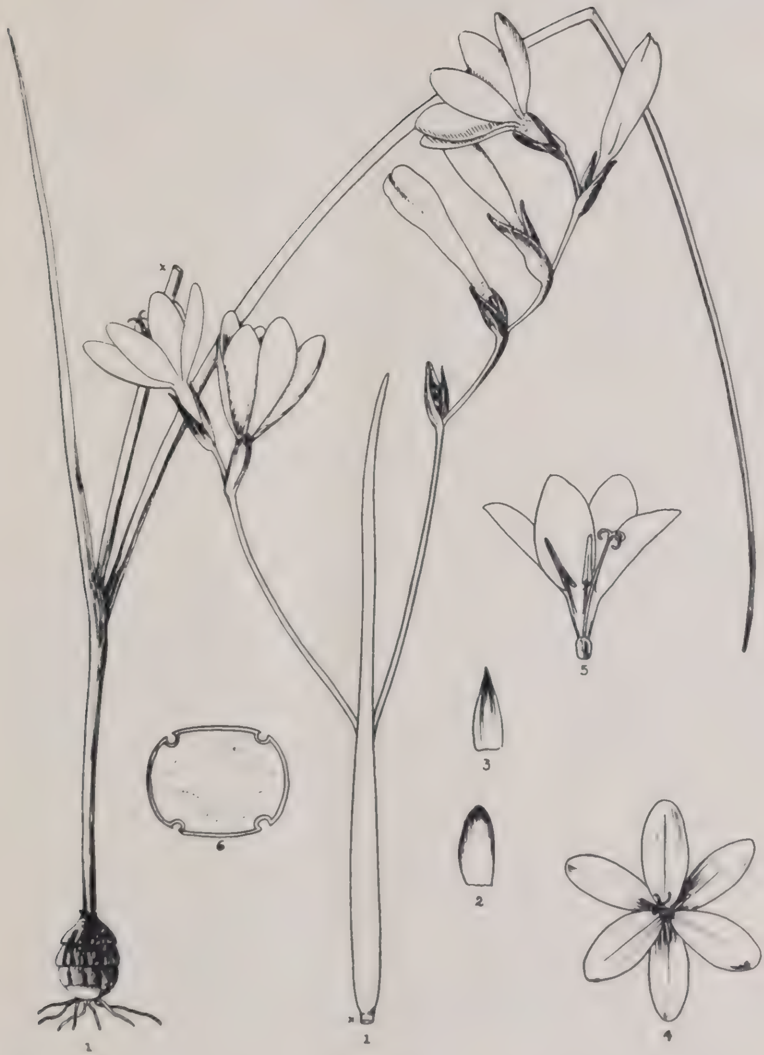


FIG. 4. *Geissorhiza teretifolia.* 1. (in two parts) Plant × 1. 2. Bract × 1. 3. Bracteole × 1. 4. Flower × 1. 5. Flower, half-section × 1. 6. Leaf, transverse section × 10.

overtopping stamens, 1·5 cm. long, branches recurved, 4 mm. long. Ovary ovoid, 2 mm. long, 2 mm. diam.

Bobartia paniculata Lewis sp. nov.

Plantae plures concretae ; rhizoma lignosum, breve, basibus foliorum mortuum fibris crassis superne 12 cm. productis. Folia basalia in rosula densa, circa 5, linearia, erecta, firma, acuminata, nervis obscuris. Pedunculum rigidum, firmum sed flexile, complanatum, circa 80 cm. altum (floribus inclusis). Spatha exterior erecta, herbacea, firma, acuta ; interior exteriori símilis. Inflorescentia paniculata, terminalis in ramulis omnibus, cymosa, cymis trifloribus, ramis 1—3, gracilibus, flexuosis, viscidis, ramulosis ex axillibus spatharum brevium viscidorum. Bractea exterior herbacea, obtusa ; interior obtusa, marginibus incurvatis. Perianthium flavidum, segmentis obtusis, circa 1·2 cm. longis, 3 mm. latis. Stamina brevia, filamentis 2 mm., antheris 2—3 mm. longis. Stylus 1 mm., ramulis 3 mm. longis. Ovarium angulatum, ad apicem latius. Capsula apice dehiscens.

Oudtshoorn Div., lower mountain slopes, Kamanassie, Zinn, S.A.M. 54287 (type, in S.A.M.) ! Kamanassiberg, 5,500 ft., Compton 10394 (N.B.G.).

Flowering season January—February.

The paniculate inflorescence distinguishes this species from all others at present described. As is usual in *Bobartia*, the inflorescence arises in the axil of a spathe borne at the apex of a long, slender peduncle, but instead of the cymes being sessile and forming a compact head as is the case in all the other species seen, each cyme is borne at the apex of a short, slender pedicel, which in turn arises from a short, slender branching stem. The peduncle is glabrous, but the flowering branches, pedicels and bracts are covered with a viscid substance, another distinct feature of this species. In all other respects this species is typical of the genus *Bobartia*.

Bobartia gladiata Ker **var. major** Lewis var. nov.

A type foliis cauleque latioribus, inflorescentia majora, differt.

Cape Peninsula, Patrys Vlei, Salter, S.A.M. 53198 (type) !

The variety differs from the typical in having a broader leaf and stem and larger inflorescence. It is not very common, found on plateaux on the Southern Peninsula near marshy places, flowering in December.

Leaves 30—40 cm. long, 5—10 mm. broad. Stem 40—60 cm. high, flattened, 5—10 mm. broad. Inflorescence compact, consisting of 6—10 cymes. Bract and bracteoles slightly shorter than in typical

B. gladiata. Flower minutely brown-spotted at centre, outer perianth-segment 2·8 cm. long, 1·3 cm. broad, inner 2·4 cm. long, 9 mm. broad.

Bobartia indica Linn. **var. minor** Lewis var. nov.

A typo planta et floribus minoribus differt.

Cape Peninsula, between Fish Hoek and Kommetje, Salter S.A.M. 53192 (type)! Lewis, S.A.M. 53710! Paarl Div., along Agter Paarl Road, Salter 6569 (S.A.M. and B.H.)!

This differs from the typical in being a smaller plant with smaller flowers.

Leaves terete, flexible, 40—60 cm. long, 1 mm. diam. Peduncle about 33—44 cm. high. Spathe acuminate, 12—18 cm. long. Inflorescence of 6—9 cymes. Perianth-segments—outer oblong, obtuse, 1·9 cm. long, 8 mm. broad, inner linear-oblong, obtuse, 1·8 cm. long, 6 mm. broad. Stamens—filaments 4 mm., anthers 4 mm.

Klattia partita Baker **var. flava** Lewis var. nov.

Planta circa 1 m. alta; caules juvenales ab foliorum partes inferiores pubescentes demum glabrescentes. Inflorescentia circa 10-flora, terminalis, sessilis. Flores binati, bracteati spathis, bracteis, bracteolisque. Spatha anguste linearis, acuminata, 2·8 cm. longa, bractea scariosa, circa 2 cm. longa, bracteolae similes bractea coalitae, circa 1—1·6 cm. longae. Perianthii tubus 6 mm. longus; segmenta flava, 5—5·5 cm. longa, exteriores interioribus latiores, apices cochleariformibus. Stamina ad apicem perianthii tubi adnata. Stylus ad apicem perianthii segmentorum attingens, stigmate minute trilobato. Ovarium inferne perianthii tubo fusum.

Caledon Div., Hottentot Holland Mtns., Landdrostkop, Stokoe, S.A.M. 54461 (type)!

The variety differs from the typical *Klattia partita* in the colour of its flowers, which are pure primrose-yellow instead of purple-blue, and in being a taller plant, about 3 feet high instead of 1—2 feet. From dried material seen, the pubescence found on the young stems and leaf bases of the variety is present in the typical form as well, the older parts being glabrous.

Flowering season December.

Plant about 3 feet high. Leaves up to 21 cm. long, usually 10—11 cm. long; young stems and bases of leaves minutely pubescent, older parts glabrous. Inflorescence terminal, sessile, about 10-flowered, flowers arranged in pairs, each flower subtended by a narrow-linear acuminate spathe, 2·8 cm. long, and a bract and pair of fused bracteoles, all colourless, membranous, about 2 cm. and 1·6—1 cm. long. Perianth-tube 6 mm.

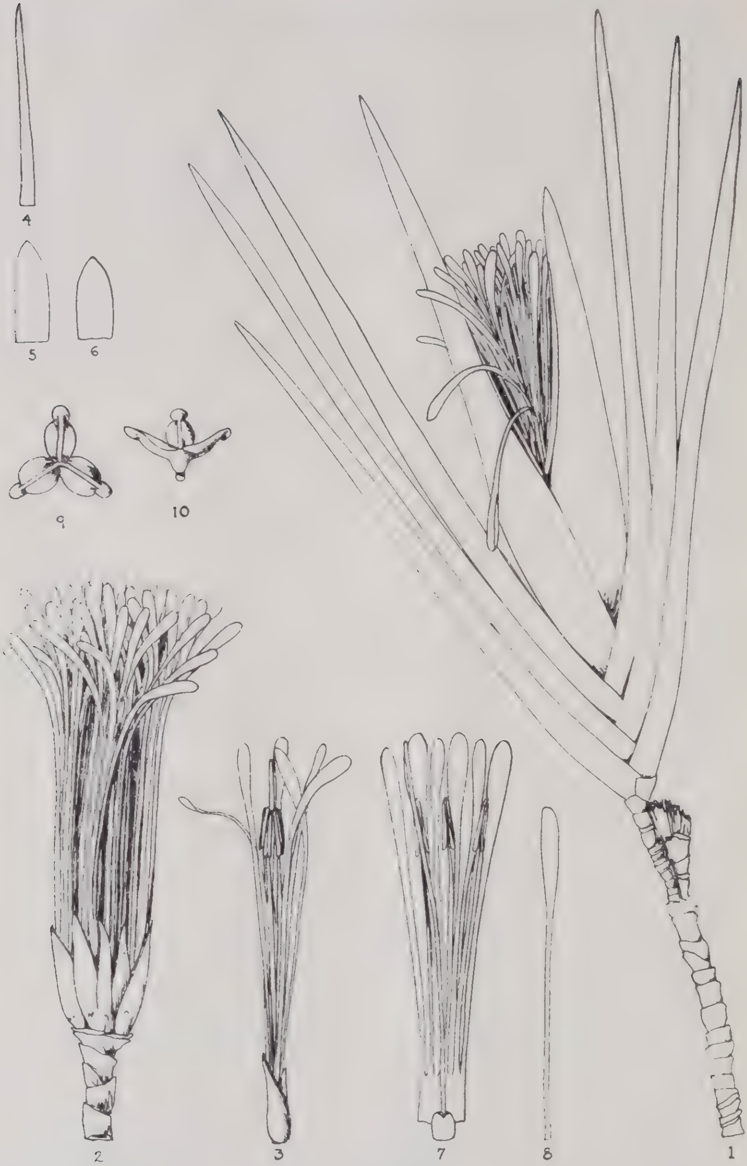


Fig. 5. *Klattia partita* var. *flava*. (All figures natural size.) 1. Flowering shoot. 2. Flower cluster, outer spathes removed. 3. Single flower. 4. Spathe (inner). 5. Bract. 6. Bracteoles. 7. Flower laid open. 8. Outer perianth segment. 9. Ripe capsule, open. 10. Ripe capsule, open, side view.

long ; segments yellow, about 5—5·5 cm. long, 2 mm. or less broad, outer broader than inner, spoon-shaped at top. Stamens attached to top of perianth-tube, filaments 3·4—3·8 cm. long, anthers basifixed, about 1 cm. long. Style reaching top of perianth-segments ; stigma minutely 3-lobed. Ovary fused with perianth-tube in lower half.

Moraea odorata Lewis sp. nov.

Cormus globosus vel cylindricus, tunicis e fibris duris, lignosis, exterioribus parallelis, interioribus conjunctis, superne breviter productis, compositis. Planta 35—50 cm. alta, caule ramoso, sub nodis viscoso. Folium basale 1, lineare, conduplicatum ; foliorum caulinorum inferum lineare, basali simile, 7—10 cm. supra base caulis insertum, caulem breviter circumfusum, superiora 2 vel 3, vaginantia, brevia, acuta vel acuminata, nervis numerosis parum insignibus. *Rami* breves, recti, graciles, viscosi. Spatha acuta, folio caulino supremo similis. Segmenta perianthii basi unguiculata, exteriora (ungue incluso) 2—2·2 cm. longa, 7 mm. lata, obtusa, interiora breviter acuta vel obtusa, 2—2·5 cm. longa, 4—5 mm. lata. Stamina filamentis omnino conjunctis, antheris minute apiculatis. Stylus ramulis patentibus, cristis erectis, acuminatis. Lobi stigmatici 2, minimi, in apice styli. Capsula ovoidea, circa 6 mm. longa, 3—4 mm. diam.

Cape Peninsula, Camp Ground, Rondebosch, T. T. Barnard, B.H. 2034 (type) ! Cape Flats, sand near Zeekoe Vlei, L. Bolus, B.H. 15205 !

This species comes very near *M. viscaria* and *M. viscaria* var. *bituminosa*. From the former it differs in having a larger flower, the segments patent but not reflexed, obtuse or very shortly acute, and from the latter in having a smaller flower and shorter spathe. It also differs from both in the colour and sweet scent of the flowers. The flowers are white, the outer segments mauve outside and minutely spotted with yellow at the bend on the inner surface. They are sweetly scented and open at about 3 p.m., remaining open in the evening. This species, found on sandy flats, flowering during November and the first half of December, is not at all common.

Corm globose or somewhat elongated, about 2—3 cm. diam., tunics of hard, woody fibres, outer ones parallel, inner more or less fused together, extending upwards in a short neck. Plant 35—50 cm. high, stem usually much branched, a small viscid patch below each node. Leaf 1 basal, linear, conduplicate, up to 75 cm. long, about 5 mm. broad ; cauline 1 linear, like basal, arising 7—10 cm. above base of stem, fused round stem at base only, 2 or 3 short, acute or acuminate, almost entirely sheathing, 6·5—3 cm. long, veins numerous, not very conspicuous. Branches short, erect, slender, viscid. Spathes shortly acute, 2·2 cm.

long, exactly like upper cauline leaf. Perianth-segments with a narrow claw at base about 5 mm. long ; outer 2—2·2 cm. long (including claw), 7 mm. broad, obtuse ; inner shortly acute or obtuse, 2—2·5 cm. long, 4—5 mm. broad. Stamens—filaments entirely fused, 6 mm. long, anther 4 mm., a minute apiculus at apex. Style 6 mm., branches spreading, about 5 mm. long, up to 4 mm. broad ; crests erect, acuminate, 6 mm. long. Stigmatic lobes 2 minute flaps at top of each style branch. Capsule ovoid, about 6 mm. long, 3—4 mm. diam.

Moraea tripetala Ker. **var. Jacquiniana** Schlechter ex Lewis var. nov.

Iris tripetala Jacq. Ic. t. 221 (*ex parte*, figura media). *Moraea Jacquiniana* Schlechter (MS), Bolus and W. Dod, List of Fl. Plants and Ferns of Cape Peninsula, p. 328.

A typo caule breviore, folio angustiore, floribus purpureis minoribus differt.

Cape Peninsula, Kloof Nek, T. T. Barnard, B.H. 22571 ! Hout Bay, Skoorsteen, Lewis, S.A.M. 54396 ! Vlaggeberg, Dod 457 (B.H.) ! Constantiaberg, Dod 1919 (B.H.) ! Muizenberg Mt., Bolus, 3393 (B.H.) ! Pauls Berg, Lewis, S.A.M. 54301 !

This variety differs from the typical *M. tripetala* in its smaller size, very narrow, almost terete leaf and smaller flower, which is purple in colour and has a more rounded lobe to the outer perianth-segments. It is a late-flowering plant and, while *M. tripetala* is found on the flats and lower mountain slopes during August and September, the variety is common on dry upper mountain slopes and plateaux, flowering from October to January.

Schlechter's name, *M. Jacquiniana*, was not published, although Bolus and W. Dod have quoted it as if published in their list of Peninsula Plants.

Plant very slender, about 30 cm. high, stem simple. Leaf conduplicate, very slender, terete in appearance, up to 60 cm. long, about 2 mm. broad. Perianth-segments—outer with basal claw, 1—1·2 cm. long, upper part nearly ovate, obtuse or shortly acute, 1·2—1·4 cm. long, 1—1·2 cm. broad ; inner a minute cusp, 6 mm. long or less. Stamens—filaments fused for 1 mm., 3 mm. free ; anthers 6 mm. Style 1 mm., branches 1 cm. long, up to 2 mm. broad ; crests narrow-linear, acute, incurved, 5—8 mm. long.

V. MISCELLANEOUS NOTES ON IRIDACEAE.

Gladiolus subaphyllus N. E. Brown, Kew Bull. 1909, 53.

Geissorhiza gracilis Baker, Handbk. Irid. 155 (1892) ; Fl. Cap. VI, 70

(1896). *Ixia brevifolia* Baker. Handbk. Irid. 165 (1892) ; Fl. Cap. VI. 84.

Tyson no. 1872 from the Zuurberg Range, Griqualand East, is the type of *Geissorhiza gracilis* Baker and *Ixia brevifolia* Baker. On examining these two types I found them to be identical and that the plants do not belong to the genus *Geissorhiza* nor to *Ixia* but to the genus *Gladiolus*, being identical with *Gladiolus subaphyllus* N. E. Brown. As the names *brevifolius* and *gracilis* have already been used in the genus *Gladiolus* the later name, *Gladiolus subaphyllus*, should be retained for this species.

Watsonia Cooperi (Baker) L. Bolus, Journ. Bot. (1929) LXVII, 135.

Tritonia Cooperi Baker, Handbk. Irid. 192 (1892) ; Fl. Cap. VI, 122. *Tritonia quinquenervata* Foster in Contrb. Gray. Herb. CXIV, 46 (1936).

There is no doubt that a leaf of *Anapalina nervosa* has been mounted by mistake with *Watsonia Cooperi* and it was to this that Baker referred when he described the five strong nerves on the leaf.

Tanaosolen nervosus (Baker) Lewis comb. nov.

Tanaosolen nudus N. E. Br. in Trans. Royal Soc. S. Afr. Vol. XX, 262 (1932). *Ixia nervosa* Baker Handbk. Irid. 166 (1892) ; Fl. Cap. VI, 85. *Morphixia nervosa* Baker in Journ. Bot. (1876) 237 ; Journ. Linn. Soc. XVI, 98 (1877).

The types of *Tanaosolen nudus* and *Ixia nervosa* were compared at Kew by myself in 1934 and found to be identical. The earlier specific name should therefore be retained in this new genus.

Babiana striata (Jacq.) Lewis comb. nov.

Gladiolus striatus Jacq. Collect. V. 28 ; Ic. t. 260 (1796) ; Baker, Handbk. Irid. 209 (1892) ; Fl. Cap. VI, 148 (1896). *Tritonia striata* Ker in Konig and Sims Ann. I. 228 (1805) ; Gen. Irid. 117 (1827). *Antholyza striata* Klatt. Erganz. 12 (1882). *Gladiolus formosus* Pers. Sym. 1, 44. 1802 *Hebea formosa* Eckl. Top. Verz. 42 (1827).

As can be seen from the above synonymy, there has been a certain amount of confusion about the genus to which this plant belongs. I have examined fresh material from the Clanwilliam Div. which matches Jacquin's figure very well indeed and am in no doubt that it belongs to the genus *Babiana*, its affinity being with *B. spiralis* (see Fl. Pl. S. Afr., Vol. XVIII, no. 69, t. 686). The corm is typical of this genus, having numerous soft but wiry reddish-brown, fibrous tunics, which extend upwards to form a neck.

The plant figured by Jacquin and subsequent descriptions are without locality. I therefore quote the following which belong to this species, flowering during August and September.

Clanwilliam Div., Oliphants River Valley, Archdeacon Lavis, B.H. 18445! between Greys Pass and Clanwilliam, Bolus, B.H. 22570! near Van Rhynsdorp, Marloth 7468 (B.H.)!

Gladiolus venustus Lewis nom. nov.

Gladiolus formosus Klatt in Linnaea XXXII, 692 (1863); Baker, Handbk. Irid. 225 (1892); Fl. Cap. VI, 161 (1896), not of Persoon.

The name *G. formosus* having already been used, although incorrectly, in this genus, I propose changing the name of the plant hitherto known as *G. formosus* to the above name.

Hesperantha insipida Lewis nom. nov.

Geissorhiza pauciflora Baker in Bull. Herb. Boiss. 2nd Ser. IV. 1004 (1904).

Examination of the co-type in the Bolus Herbarium has shown this to be a *Hesperantha* and, as the name *pauciflora* has been used in this genus, I propose the above name for this rather insignificant species.

Tritonia Cooperi (Baker) Klatt, Erganz. 24 (1882).

Morphixia Cooperi Baker, Journ. Bot. (1876) 237; Journ. Linn. Soc. XVI, 98 (1877). *Ixia Cooperi* Baker, Handbk. Irid. 166 (1892); Fl. Cap. VI, 84 (1896).

Examination of this plant has proved that it is not an *Ixia*, and I therefore restore it to its correct genus, *Tritonia*.

Lapeyrousia setifolia (Linn. f.) N.E. Br. Journ. Linn. Soc. XLVIII, 30 (1928).

The synonymy is as follows:—*Gladiolus setifolius* Linn. f. Suppl. 96 (1781); Thunb. Diss. Glad. 18 (1784); *Lapeyrousia divaricata* Baker, Journ. Bot. (1876) 337; Fl. Cap. VI, 91 (1896). *Chasmatocallis Macowani* Foster, Contrb. from Gray Herb. CXXVII, 40 (1936).

Mr. R. C. Foster described a new genus, *Chasmatocallis*, based on MacOwan 1975 (type in Gray Herbarium). There are co-types in the South African Museum Herbarium and Bolus Herbarium and, after examining them, I find that I cannot agree with Mr. Foster in regarding this as a new genus. I consider that it belongs to the genus *Lapeyrousia*, being closely related to *L. serrulata*, *L. aculeata*, *L. angustifolia* and one or two other species. Mr. Foster has noted that in "habit of growth it seems to resemble some species of *Lapeyrousia*, such as *L. Fabricii* (Delaroche) Ker and its relatives, a resemblance strengthened by the deeply bifid stigmas," but from this he goes on to say that "the spathes resemble those of *Exohebea*, probably the closest relative of the new genus, but the outer spathe is herbaceous, not brown and membranous." Any resemblance there might be to the genus *Exohebea* is purely superficial and in the flower only, the two genera being entirely different, the differences being in the corm, leaves, stem, bract and style branches.

To return to the first statement that it resembles some species of *Lapeyrousia*, I should like to elaborate this to show why I consider that it belongs to this genus. As I have stated earlier in this paper, the corm is of very great importance in determining the genera in the Iridaceae. There is no corm present on the type specimen (according to description), but corms are present on specimens exactly matching the co-type in the S.A. Museum Herb., also the remains of a corm on one of the co-type specimens, and it is typical of the genus *Lapeyrousia*. It is conical in shape, flat at the base, and the corm tunics are hard, compact and almost woody. Another important character is the linear falcate leaf with its 3—5 more or less prominent veins, typical of the section of *Lapeyrousia*, to which this species belongs. The herbaceous bract and branched stem are also typical. The flower is more irregular than is usual in *Lapeyrousia* but it has the bifid style branches characteristic of the genus. Calli on the 3 lower perianth-segments are found in this and in two or three other species of *Lapeyrousia*, *e.g. L. serrulata* Schltr.

Moraea ceresiana Lewis nom. nov.

M. violacea L. Bolus in S.A. Gard. Vol. XVIII, 116 (1928).

I propose the above name for the species, allied to *M. tenuis* Ker, to which Dr. L. Bolus has given the specific name *violacea*, a name already used by Baker (*M. violacea* Baker in Rev. Cult. Colon. VIII, 862). The type specimens come from the Ceres Div., and, as far as is known, it has not been collected elsewhere.

Romulea Macowani Baker, Journ. Bot. 1876, 236.

Syringodea luteo-nigra Baker in Kew Bull. 1897, 281.

The types of *Romalea Macowani* and *Syringodea luteo-nigra* have been examined and found to be the same.

VI. THE IDENTITY OF *Tulipa Breyniana* L.

Since the last quarter of the 18th century there has been a general tendency to regard "*Tulipa Breyniana* L." as being the plant commonly known as *Baeometra columellaris* Salisb., though during the latter part of last century Linné's name was not used. Salisbury himself (Trans. Hort. Soc. 1, 330, 1812; Gen. Pl. 54, 1864), when creating the genus *Baeometra*, for one species quotes the Linnean name as belonging to his plant. This identification is based upon the description in the second edition of the Species Plantarum (L. Sp. Pl. ed. 2, 438, 1763), about which there is no doubt. Indeed, many authors quote only the second edition in reference to the species : examples are Thunberg (Fl. Cap. ed. Schultz 331, 1823), Schlechtendal (under *Kolbea*) (Linnaea 1, 82, 1826), and Baker (Journ. Linn. Soc. Bot. 17, 446, 1879 ; Fl. Cap. 6, 523, 1897).

Tulipa Breyniana was, however, first described in 1753 (L. Sp. Pl. 306, 1753), when the description was as follows :—

"T. caule polyphyllo, foliis linearibus.

"Sisyrinchium, ex phoeniceo suavrubente, aethiopicum. Breyn. Cent.

"t. 36. Rudb. Elys. 2, p. 13, f. 11.

"Hab. in Aethiopia. 4."

This description is too short for identification without reference to the cited figures. The plate of Breynius (Pl. Exot. Cent. 21, t. 36, 1677) represents a rather tall-growing plant with a small corm. The leaves are elongated and not regular. The flowers are solitary and tulip-like on stalks which have the lower parts wrapped round by sheathing bracts. In the shoot with a complete flower the bracts are represented as being loose, but in three others they wrap closely round. In the flower itself no stamens are represented, nor is the ovary shown ; the tip of the style appears between the perianth-segments.

The plate represents a plant quite unlike *Baeometra*, but, in spite of the lack of floral details, is quite a good likeness of *Homeria collina*. The accompanying description confirms this. Breynius was evidently dealing with the red form of the species. From the fact that Linné placed the plant in *Hexandria Monogynia* and in the genus *Tulipa* it is evident that he had not a specimen before him, but was basing his description on the external features depicted in the plate.

The plant figured by Breynius was a recognised species previous to 1753 and evidently not a rare one : it is included by a number of writers among whom may be mentioned Ray (Hist. Pl. 1168, 1686), Kolbe (Beschr. v. de Kaap 1, 302, 1727) and Hermann (Cat. Pl. Afr. 21, 1737).

In the second edition Linné made some changes and additions to the description, all of which mark divergences from the characters of the plant figured by Breynius. It would seem that before 1763 he obtained a specimen of *Baeometra* and described it without realising that it was not the plant of his original description. The citations are not changed, but in the diagnosis he introduces the word "*multifloro*" and adds the following paragraph at the end :—(L. Sp. Pl. ed. 2, 438, 1763.)

"Folia caulina 6 s. 7, lineari-lanceolata : suprema sensim breviora.

"Flores ad apicem 3 s. 4, minores quam plantae Breynii cultae.

"Petala basi angustata. Stylus nullus."

While these additions clearly refer to *Baeometra*, they are at variance with the plate originally cited, and show that there are two plants involved. The specimens in the Linn. Herb. are not early ones and cannot be taken as the type of the species. Breynius' plate upon which the first description was based constitutes the type and the specific name must be retained for this.

Kunth (Enum. 4, 162, 1843) appears to have been the first to realise that there are two plants associated here. Unfortunately, while realising that the plant of 1753 is not *Baeometra*, he quotes both the description and citations of 1763 as applying to that plant, and thus tended to confirm the view that the Linnean species and Salisbury's are the same.

According to the International Rules the plant of 1753, typified by Breynius' plate, must bear the original name, and this is not valid for that of 1763. This involves a change in the commonly accepted nomenclature. The species becomes :—

Homeria Breyniana (L.) Lewis comb. nov.
Tulipa Breyniana L. Sp. Pl. 306, 1753. *non* ed. 2, 1763.
Homeria collina Vent. Dec. Gen. Nov. 5, 1808.
Moraea collina Thunb. Diss. de Moraea 5, 1787. Diss. Acad. 2, 281, 1800.

Even though the Linnean epithet is not valid for Salisbury's species a change is needed as his name is antedated. It becomes :—

Baeometra uniflora (Jacq.) Lewis comb. nov.
Melanthium uniflorum Jacq. Coll. 4, 100, 1790 ; Ic. 2, 21, t. 450, 1793.
Baeometra columellaris Salisb. Trans. Hort. Soc. 1, 330, 1812.
B. Breyniana Dur. & Schinz Consp. Fl. Afr. 5, 414, 1895.
Tulipa Breyniana L. Sp. Pl. ed. 2, 438, 1763 *non* ed. 1, 1753.
Kolbea Breyniana Schlecht. Linnaea 1, 82, 1826.
Melanthium aethiopicum (Thunb. ex) Desr. in Lam. Encyc. 4, 29, 1797.

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JOURNAL

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VOL. II.

WILLIAM JOHN BURCHELL, BOTANIST.

By Helen M. McKay.

Part II.: Burchell in South Africa.

Before proceeding with this paper about Burchell's activities in South Africa, I beg the indulgence of those readers who have had the opportunity of working with his herbarium and manuscripts, if these be for them a mere account of facts which they already know. My endeavour is to present to those who have not visited, or may never have the chance of visiting the Herbarium of the Royal Botanic Gardens, Kew, but who, nevertheless, may be interested in Burchell's work, an account of what material is still extant, and in what form it is to be found.

Arrival in South Africa.

Burchell sighted Table Mountain on 13th November, 1810, but owing to bad weather, was tossed about in Table Bay and did not set foot on South African soil until thirteen days later.

He was then twenty-nine years of age, and came with the intention of travelling in the country "solely for the purpose of acquiring knowledge." Being under no obligation to any society or to any individual, he was at liberty to make his plans for his excursion, without undue external interference.

He duly presented his letters of introduction: received permission to remain in the country, and was given a warm welcome by Rev. C. H. F. Hesse, of the Lutheran Church. The parsonage (now known as Martin Melck House) at 28, Strand Street, was his home while he was in Cape Town.

Route.

The accompanying map—Plate V—gives a very general idea of what part of South Africa was visited by Burchell. It shows through which districts he passed, and by collecting information from his published map in Volume One of his *Travels*, from his *Catalogus Geographicus*, his *Catalogus Insectorum*, his drawings and his letters, interesting facts come to light regarding those parts of his route not mentioned in his published volumes.

Burchell's intention was to journey beyond the boundary of Cape Colony to the country of the Bechuanas, along the route taken by Truter and Somerville (31) in 1801, and by Lichtenstein (13) in 1805. From Litákun [Kuruman]—the chief town of the Batlaping tribe, he would turn towards the west coast within the southern tropic and try to find his way by sea to St. Helena. In the early days of 1811, he had conversations with missionaries on furlough in Cape Town from the settlement of Klaarwater [Griquatown] which lay beyond the boundary of the Colony. He learned that it would be inadvisable to consider travelling westward because of difficulties likely to arise from lack of water and from the presence of hostile tribes. Hearing of the beautiful fertile land lying to the North and East of the Colony, he decided to make Litákun his objective in the North, and after reaching it, then determine whether he would journey to east or west. He arranged that he would travel as far as Klaarwater with the missionaries who intended leaving Cape Town in May, or June, 1811.

While superintending the building and equipping of his wagon, he found time to make botanical excursions with Mr. Hesse, in the immediate vicinity of Cape Town, and to go on horseback, accompanied by Mr. Poleman, a Dane who was an apothecary but also a keen botanist, on a tour as far east as Caledon and as far north as Tulbagh. He thus acquired first hand knowledge of some of the ground which had been trodden by the great Thunberg.

His trek to the interior of the country began on 19th June, 1811, and ended in Cape Town in the middle of April 1815; it covered approximately four thousand five hundred miles. From certain fixed points on his main route, he made excursions. About a month after his arrival at Klaarwater, he joined some natives and went to a "Hippo hunt." This led to his being the first white man to visit the confluence of the Riet and Vaal Rivers, and also that of the Vaal and the Orange.

At Klaarwater he found himself faced with the difficulty of procuring servants to accompany him to the north, so he decided to journey to Graaff-Reinet and ask help from the Landdrost [deputy representative of the Governor].

Along with six Hottentots, a Bechuana and a Bushman, Burchell, on horseback, was the first European to make a track between Klaarwater and Graaff-Reinet through the dreaded Bushmanland. On his return journey he made several detours from his first path, and so was able in 1813, when once more in Graaff-Reinet, to advise the missionary Campbell which track to choose when journeying to the north.

Burchell left Klaarwater for Bechuanaland on 6th June, 1812, and arrived at Litákun, about five weeks later. In the month of August, he made an excursion to the south-east at Litákun, then turning to the north, he reached the most northerly point in his route—Chué Spring [Honing Vlei]—on 4th October, 1812. From here he went in a south-westerly direction to Klaarwater which he left for the last time in February, 1813. He travelled to the Colony through the districts now known as Hopetown, Colesberg and Middelburg. He visited the new fort of Grahamstown in 1813, made excursions to the mouth of the Great Fish River and the Kowie, and then by way of Uitenhage, Fort Frederick [Port Elizabeth], Plettenberg Bay, George, Mossel Bay, the Garcia Pass [Riversdale], Swellendam and Stellenbosch, arrived once more in Cape Town.

EQUIPMENT.

Burchell carried with him, except on his short excursions, fifty books. Those for botanical reference were Linné—*System Naturae*, ed. Gmelini: Linné—*Species Plantarum*, ed. Willdenow(32): Jussieu(33) *Genera Plantarum* ed. Usteri, and Forster—*Enchiridion Historiae Natureli inserviens* and the book on *Fuci* given to him by Tilesius in St. Helena. The copy of Jussieu, with a few marginal notes and an inscription in Latin in Burchell's handwriting, telling of the book being carried throughout his journeys in Africa and Brazil, was bequeathed by Mr. Langley, of Bedford, to the Hope Department Library, University Museum, Oxford.

Burchell was equipped with a press, a large collecting box, a magnifying glass and reams of paper, but we find him writing to Mr. Hesse from Klaarwater in 1813, for more paper to be sent to await his arrival at Fort Frederick [Algoa Bay]. This shortage of paper may account for diminution in number of botanical drawings during the early months of 1813.

COLLECTIONS.

In the late eighteenth century and in the early days of the nineteenth it was the fashion among the monied classes in Europe to possess collections of things brought from foreign lands. Knowing this, Burchell writing in 1822, gives us his opinion about the making of such accumulations :

> " To him who is satisfied with amassing collections simply for the pleasure of possessing them, such objects can afford at best, but a childish gratification, faint and fleeting : while he who extends his views beyond the narrow field of nomenclature, beholds a boundless expanse the exploring of which is worthy of the philosopher and of the best talents of a reasonable being."*

By so writing, it would seem he was conscious of the scientific work to be done, that he was able and gifted to do it, and that he had laid the foundation in South Africa for such work to be carried on. It is well to bear this in mind for the better understanding of what he accomplished.

He shows his predilection for pure field work but he did not neglect nomenclature. Every specimen collected was carefully labelled. Every label contained a number, the date and sometimes hour of acquisition of the specimen, and in most instances, a short description of the plant. Often at the time of gathering, a drawing was made of the noteworthy characteristics of the specimen. All these notes were useful when he came to classify his material.

For the preservation of his collections he used no extraordinary methods. He explains how on one occasion he adopted what he considered " a new mode " when the regular way of pressing was not practicable. When on an excursion to the top of Witsenberg, in April, 1811, he could not press and dry his specimens between paper, he carefully tied them in a large bundle about three feet long and a foot in diameter, binding them round as tightly as possible with twine and wrapping the whole in strong paper. This bundle was not opened for eight years, and when it was, the specimens were in a fit condition for scientific invesitgation : in fact the hard leaved plants were in better condition than if they had been pressed. He began to unpack his herbarium in September, 1816, and did not finish until October 1817. Had he known sooner that this new method was successful, he would have collected more when on his journey from Klaarwater to Graaff-Reinet.

He admits :—

> "the business of putting dry paper to my botanical specimens, which, being a mere mechanical employment, and recurring almost every day, became a most irksome task, yet one which was absolutely indispensable."†

It is due to his patience, to his ability and good judgment when selecting specimens that his herbarium evokes the admiration of every botanist who beholds it.

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* *Travels in the Interior of Southern Africa.* Vol. I, page 505.

† *Travels,* I, page 293.

Burchell sums up his collection in an entry in his MS., *Clavis Geographicus ad Herbarium Africanum*, as :—

" Specimens dried at Cape Town	4,000
Cape Town to Litákun	5,024
Litákun to Algoa Bay	10,507
Algoa to Cape Town	20,840
	40,371

besides a great number which have not been counted and which may amount to 10,000 more."

He gathered also more than two thousand kinds of seeds and two hundred and seventy-six bulbs.

More than five hundred specimens collected between Cape Town and the northern boundary of the Karoo, were entrusted to a farmer to be delivered in Cape Town, but they never arrived there. Thus there was formed a hiatus which was never filled up in his *Catalogus Geographicus*.

After his death in 1863, his sister, Miss Anna Burchell, presented his herbarium and the manuscripts relative to it, to the Linnean Society of London. This donation was afterwards transferred to the Herbarium of the Royal Botanic Gardens, Kew.

There were many duplicate specimens in the collection. During his lifetime, Burchell gave away several of these. Some specimens of which there were no duplicates, were loaned to botanists and were never returned, but they were, in most cases, referred to by these botanists in their various works, so cannot be considered as entirely lost. The authorities at Kew sent some duplicates of *Mesembryanthemum* to the Asa Gray(31)Herbarium at Harvard University, Mass., U.S.A. Through Professor MacOwan, South Africa acquired seven hundred specimens of various plants. These are now incorporated in the MacOwan collections in the Albany Museum, Grahamstown. A few rather small duplicate specimens were sent to the National Herbarium, Pretoria. The number of species in Burchell's collection at Kew may not now exceed three thousand.

WRITINGS.

The only work written by Burchell was *Travels in the Interior of Southern Africa*, Vol. I, 1822 : Vol. II, 1824, published by Longman. These volumes are of value to botanists because of the graphic descriptions given of the vegetation of those parts of the country through which he travelled. There are notes of plants collected, and descriptions of several new genera and species. The two volumes take the reader along the route to Griquatown, from there to Graaff-Reinet by way of the present day districts of Hanover, Richmond and Murraysburg: back to Griquatown, then north to Litákun in the division of Kuruman, and the records end with the date of 3rd August, 1812.

In his Preface to volume I, Burchell says :—

> "Of these [collections] a few are occasionally mentioned, and distinguished, either by a reference to the 'Geographical Catalogue,' or by the letter B: and, not to interrupt the text, short descriptions of them are added in the notes. These descriptions are not intended as specific characters, but are given merely as the more obvious or striking features, in order to convey to the botanist some idea of the more remarkable objects. Neither was it thought requisite, in the present work at least, to adopt every innovation in nomenclature which, since the travels were commenced, these sciences have from time to time undergone."

In an article he wrote in 1817, for the *Journal of Science and Arts*, edited at the Royal Institution of Great Britain, he says it is his intention :—

> "to communicate the result of my labours to the public, giving the narrative part of the travels separate from that relating to natural history: which later I intend to divide into distinct works, accompanied by figures of most of the subjects described."

He adhered to this intention for he mentions it again in 1822.*

These good intentions were never fulfilled. Why ? A letter written to W. J. Hooker, in 1835, throws some light on the situation.

> "From the manner in which you express yourself with regard to my botanical collections, you appear to be under very erroneous impressions, for to say that I '*will* not publish' is quite the opposite to what has ever been my intention, and the almost only pleasure I had in my travels to alleviate the excessive toil of forming them, was the anticipating of the gratification of publishing them at my return to Europe, and of obtaining the satisfaction of being useful to science, and of securing the honour due to my discoveries: and if I have been and still am being robbed of these honours by others who have less on their hands than I have, [and] can run the publishing race with more expedition, I feel most sensibly the injury I sustain. Many circumstances have unfortunately concurred hitherto to tie up my hands, but I do and shall ever look to Natural History as a most delightful and congenial employment for my future years.

---

* *Travels*, I, page 18.

> When you speak of my *not* publishing my African plants, you seem to have forgotten that I have communicated a considerable number of new species to De Candolle's *Synopsis*, and that I took to him at Geneva all the *Compositae* I could then find or get at.
>
> My Mosses were a long time in your hands for the purpose of publishing the new species: as were my *Fuci* in those of Mr. Turner(30). My ferns have been nearly three years in Dr. Greville's(35) possession, with the same intention. All my *Orchideae* have been in Lindley's hands above two years. Mr. Bentham has had all my *Labiatae* and not only published them, but has returned me my specimens. After the consumption of so much of my property by my travels and the disinterested pursuit of science all the rest of my life, the obtaining of assistance by payment is quite out of the question."*

It is to Burchell's herbarium and his manuscripts that botanists have to turn for information about the bulk of his collection. The manuscripts consist of :—

A. *Memoranda Botanica* MS. I.
This is divided into three parts : 1. *Ephemeris*, to p. 116
2. *Memoranda* relating to Portugal, Madeira, Teneriffe and Brazil.
3. Catalogue of Bulbous Roots brought from South Africa (planted at Fulham in 1816).

B. *Catalogus Geographicus Plantarum Africae Australis Extratropicae quas in Itinere quinquenni ab anno* 1810 *ad* 1815 *Collegit atque descripsit.*

C. Book of Labels : folio volume of 280 pages.

D. *Hortus Fulhamensis* MS. *Catalogus Plantarum Africae Australis extratropicae* (*exceptis* 2 *ad* 51) *quorum Semina in horto propro apud* Fulham *sevit* Gulielm J. Burchell No. 52-2019.

E. *Memoranda Botanica* MS. II,
and his *Clavis Geographicus ad Herbarium Africanum.*

F. The Index to the Aboriginal, African and Dutch names of the plants of Southern Africa.

This last manuscript was published in *The Journal of South African Botany*, Vol. IV, October 1938.

In all his manuscript volumes, there are inserted many strips of paper bearing interesting notes.

A. 1. The *Ephemeris.* In Plate VI is reproduced two typical pages of this note-book. The description in Latin of *Mahernia grandiflora* occupies page 74 and its reverse side : on page 75 is an interesting note in

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* *Hooker*, Sir William J. Letters (MSS.) Vol. LVIII, No. 17, Kew.

English. On page 74, Burchell indicates by " Ic 8.7.17 " that he made a drawing on 8 July, 1817, of the plant raised from seed No. 307 which had been gathered on 30th October, 1812 (on his way between Chué Lake [Honing Vlei] and the Moshowa River, in Bechuanaland). He had procured specimens of the same plant on his outward journey between Litákun and Chué Lake, C.G. No. 2333 and again No. 2354. The description is made about the one grown from seed 307 C.G. 2409.

The notes in the *Ephemeris* from 1—34 were made in Burchell's youth, 1801—03. Number 35 and subsequent numbers bear dates from 1 November, 1812, up to September, 1823, and give in most cases, information about the growth of the bulbs he had planted at Fulham. By collating this information found in the *Ephemeris* with that in his Catalogue of Bulbous Roots, and in his *Catalogus Geographicus* together with that on his various slips of paper and on some of his drawings, a record can be made of the bulbs taken by Burchell from Bechuanaland, and from the North-east and Eastern Province.

Long before his time, Cape Colony was famous as the home of many bulbs cultivated in Europe. Up to his day, most of the collection had been made in the Western Province. He brought his specimens from far inland and was the first traveller to give information of them in a scientific way.

B. His *Catalogus Geographicus.*

This important manuscript contains his rotation-list of plants. Every specimen was numbered and the number, the locality and date of collection were entered in the *Catalogus* ; this information also appeared on the label attached to every specimen. The numbers run from 1 to 8,739 under the dates 5 December, 1810, to 1 August, 1815. There are 572 stations recorded, some of which are repeated under different dates, for the catalogue is a faithful register of his itinerary. Allowing for his duplication, there would be approximately 488 separate stations.

The generic and specific names are filled in against only a portion of the entries, and in many cases only the generic appears. The letter written to Hooker in 1835, helps to explain why this is so.

Burchell was working on this catalogue as late as 1860 :—

> " On June 11, 1860, I finished the rubbing out of the pencil writing which I had anywhere in all my African and Brazilian Catalogues replaced in China Ink of *this* tint, consisting of 24 8vo. vols. and 1 folio (vol. 9)."*

Four years before this, he wrote on a slip of paper :—

> " All the Labels from No. 3604 to 8735 have not yet (30.1.1856)

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* *Memoranda Botanica*, MS. I, Part II.

> been copied into the *Catalogus Geographicus*, the original descriptions and notes made at time of collecting are to be found on the original labels which are pasted into one large folio volume."

C. The volume of labels. Some labels left by Burchell in this folio have been removed and affixed to his herbarium sheets. A few are in the National Herbarium, Pretoria.

D. The record of seeds planted by him in his garden at Fulham, gives the *Catalogus Geographicus* number (the locality at which they were gathered can be obtained by referring to that volume), the date of the sowing of the seed, and the date when it appeared above ground. There is also an indication if a drawing was made of the plant and its progress in growth. Occasionally there is information such as this :—

> "*Asparagus laricinus* C.G. 1971. This specimen is still living and flourishing in my collection at Fulham 8.5.60."

The seed of this had been gathered in the vicinity of Griquatown on 14 February, 1812.

Burchell did no laboratory research : at heart he was a horticulturist. Consider these recordings :—

> "*Amaryllis coranica*. No. 1. flowered 13.7.18, a very large umbell with 34 flowers. Flowers of a red variety with very little white. May be parted with—Given to Lord Carnarvon X.7.21. No. 2. flowered 20.7.18 umbell with 17 flowers. Flowers with much white and it is the largest bulb and is to be reserved for my own collection. No. 3, flowered 16.8.20 with umbell-flowers smaller than the other bulbs but very delicate and white at first opening and is probably the bulb from which my drawing was made in 1816. That is now the smallest bulb. It has perfected seed and is perhaps the same bulb which perfected seed in 1816.
>
> No. 4. In 1821.27.7 Flowered—32 flowers spotted *vide* the drawing of a single flower."

Three of the drawings mentioned are in the Gubbins collection.

> "The seed of *Amaryllis riparia* sown in 1818 did not flower till June 1854."

E. The *Clavis Geographicus* which is an inset in *Memoranda Botanica* MS. II., would seem to have been intended as the index to his *Catalogus Geographicus.*

Many notes made by Burchell and inserted in the various Volumes of his Catalogue show that he had calculated the likely cost of producing the work. Here is one entry :—

> "The thirteen volumes give 655 for the mean number of each volume."

The volumes have been rebound since Burchell's day and are not quite in the order in which he left them.

Another is :—

> " 596 pages besides intermediate room for names of Stations which may be at least 50 pages more or about 50 pages of size and type of Smith's *Compendium Flora Brit.*"

There are notes about the use of his abbreviations.

For instance :—

> "] is placed at the end of descriptions made on their native spot from live plants.
>
> [is placed at the beginning of those descriptions which have been made since from the *dried* specimens.
>
> ⁅ is placed at the beginning of those descriptions which have been made from *living plants in Europe.*
>
> (-) shows that the specimen was collected at only one spot.
>
> ¿ after a name denotes certainty.
>
> 6 p.m. At about 6 o'clock in the afternoon. By referring to the Journal the hour of the day serves to point out more exactly the spot where the specimens were gathered."

What more detailed information could Burchell have given us ?

BOTANICAL DRAWINGS.

During his South African journey, he made nearly five hundred sketches. Of this number the whereabouts of one hundred and fifteen has not been traced, but of the missing numbers, only fifty-one are of dates not covered in the *Travels.* Burchell does not say how many of his drawings were of botanical interest. In the Gubbins collection* there are eighty-four, and twenty-six others are in South Africa in the possession of individuals. Drawings of *mesembryanthemum* were given to Haworth(36), and from item 301 in the sale catalogue (1865) of Burchell's estate, it appears Mr. Hemsley of Kew bought " A Folio of Botanical Drawings and Sketches, Orchidacious Plants, etc." As the folio has not yet been traced, it cannot be certified that it contained original drawings by Burchell : it may have been Lindley's work.

Of those in the Gubbins collection, sixty-seven were drawn in South Africa, the remaining seventeen were done in England and are records of plants grown from seeds or bulbs cultivated at Fulham.

Those made in South Africa—sometimes pencil, sometimes colour-wash sketches—are not finished works as are some of those done in

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* The Gubbins Collection is housed in the University of the Witwatersrand, Johannesburg.

England, but in every case, they serve their purpose admirably and exhibit Burchell's power of accurate observation. He regarded his drawings as a means of reminding himself of things seen, and of the salient points which he wished to record.

By permission of the Gubbins Trustees, a page from one of his sketch books is here reproduced—Plate VII. It shows a pencilled record of a specimen—C.G. 3805—of *Mimusops* gathered by him on 27 September, 1813, at his Kowie Station.

It is hoped that some day if funds are available, all his drawings with his notes relative to them may be published.

LETTERS.*

In the few letters that Burchell wrote while on his trek, there are practically no direct references to botany, but rather to his collections as a whole. Writing to Mr. Hesse, from Graaff-Reinet, in April, 1813, he says :—

> ". . . . Your last letter, I am sorry to see, expresses too great expectations from the result of my labors. I beg you will lay aside all ideas of hearing of great discoveries."

To Mr. Polemann he wrote from Grahamstown in August, 1813 :—

> "I have indeed not been idle during my absence : but my industry has produced nothing worthy of public curiosity."

At the same time, he wrote to Mr. Hesse :—

> "I may congratulate you on the safe arrival of the 'second little stranger.' When you say that I have 'laid the foundations to births of a different nature,' it is an enigma that has puzzled me and you must give the solution of it yourself. I indulge myself in the idea that your botanical walks round Cape Town have sometimes brought me to your remembrance. I smiled at your account of having at last got the botanical books into your possession. I am sorry that Professor Willdenow is dead, I have the greatest respect for his talents and industry and should it ever have been my good fortune to have visited the Continent, I should have done myself the honour of paying him a visit : I would like also to flatter myself that I may one day have the pleasure of presenting myself before our mutual friend Professor Lichtenstein."

In a letter headed, "In the Forest near George," written in September, 1814, he says :—

> "I am not surprized that so little is known scientifically of the

---

* Letters are in the Hope Dept., University Museum, Oxford : in the Library, Royal Botanic Gardens, Kew.

> nature of the forests in this part of the Colony for fatigue and time required to explore their contents is very great. They have occupied me these last six months but I must now take my leave."

His last letter written to his father from Cape Town was dated 5 August, 1815.

> " I shall be obliged to draw on you for about £250 besides 84 for my passage and 50 for freight. [He had 48 packages.] This amount is so much greater than I expected owing to my being obliged to leave my oxen and waggons to be hereafter employed in the collecting of *Orchilla*."

What finally happened to his wagon is not known, but regarding the *orchilla*—a lichen yielding a violet, mauve or purple colouring matter—there were communications between the Governor of Cape Colony and the Colonial Agent for the Cape of Good Hope.*

Shortly after his return to Cape Town, in April 1815, Burchell discovered on waste land belonging to the Government, *orchilla* growing in considerable quantity. He wrote to Lieut. Col. Bird, Deputy-Colonial Secretary, pointing out that the collection and export of this weed could be made beneficial to the Colony, and suggested that he be granted exclusive permission to gather and export it during a period of seven years. He wrote :—

> " It is a plant that is impossible to cultivate and which no kind of cattle will eat. After being once plucked it will grow again and may be collected annually."

In August, 1815, Lord Charles Henry Somerset† wrote from Government House to Earl Bathurst, Secretary of State, calling attention to Burchell's discovery, and requesting consideration for a reduction of the tax on the commodity if imported into England, and for preference for the South African product over that from Portuguese and Spanish settlements. What the ultimate result of this correspondence was may possibly some day be unearthed from official records, but up to the present no Burchell letters have been found to elucidate the matter. It must be remembered that he was a naturalist, and as he had proved while on St. Helena, had no flair for commercial undertakings. No doubt the *orchilla* specimens went with his other ninety specimens of *lichens* to Dawson Turner at Yarmouth.

Burchell's botanical work was accomplished principally in the divisions of Crypotgams and Phanerogams. Palaeobotany is never mentioned by him. The one hundred mosses in his collection were examined and recorded by Hooker, and his fifty-six samples of Fungi by Turner. His collection of algae was, in his old age, given to Mrs. J. E. Gray(37), and no doubt went with her one which is now in Cambridge.

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* *Sundry Civil and Military Officers and Private Individuals*, C.O. 156, page 685, No. 31.

† *Theal. Records of the Cape of Good Hope.* XI, page 390.

Haworth was the first to make a systematic classification of the species of the genus *Mesembryanthemum* and Burchell gave him not only specimens from his herbarium, but also plants grown from seed. He made drawings for Haworth, but the one reproduced here in Plate VIII was executed in South Africa in August 1811, while he was in the Roggeveld, and is of particular interest.

In 1919, Dr. N. E. Brown in his paper *New and Old Species of Mesembryanthemum with critical notes** writes about *M. campestre* :—

> " Burchell has stated that it is ' allied to *M. pulchellum* Haw.' But this is quite a mistake, for it belongs to the very different section *Vaginata*."

Brown gives his reasons for his criticism, but, had he seen this drawing his argument would have been with Haworth and not with Burchell, for here, beside the plant which had been sketched *in situ* is Haworth's writing ; and there is no doubt about it for Burchell has taken the trouble to tell us it was *ex manu Haworthii*.

It was known to Dr. N. E. Brown that there were drawings made by Burchell, but he was unable to locate them. He was anxious to see the one of *M. turbiniforme*, but could not trace it : it is No. 534, and is in one of the sketch books in the Gubbins collection.

APPRECIATION OF BURCHELL BY SOUTH AFRICAN BOTANISTS.

During his trek, Burchell " the culler of simples," as he was called in the Quarterly Review of November, 1819, culled specimens in what is now recognised as the evergreen sclerophyllus bush of the Western Province ; in the thorn country and desert shrub ; in the tall grassland of the Eastern Province ; in the evergreen and deciduous bush and sub-tropical forest along the south coast of Cape Province, and he had something to note about them all.

Many great botanists have trodden the paths he trod in South Africa ; one and all of them appreciate what he did, but no greater admirers has he had than Dr. Harry Bolus and Professor MacOwan, the two men who lived in the period bridging the days of collectors with that of workers in Botany as a pure science. Bolus's reference to Burchell as " one of the best equipped by his numerous gifts for careful researches," is very often quoted. MacOwan's pronouncement that :—

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* *Journal Linn. Soc. Botany.* XLV, page 127.

> "Compared with Burchell's collections and unpublished manuscripts it may be said that while Drège's journeys were more extensive and his recorded observations more fully and equally accurate, his collections probably twice as rich in species, his specimens in completeness, range and preservation fall far below those of the 'earlier English traveller'."*

is valuable criticism coming from one who did so much for South African botany.

In 1918, a botanical survey of the Union of South Africa was begun. The first memoir published in 1919, was one entitled *The Flora of the Division of Uitenhage and Port Elizabeth*, and the writing of it was entrusted to Dr. S. Schonland. He remarks that Burchell had passed through this area in 1814, and had given a careful record of his route, but regrets that the collections then made were not fully worked up.

Burchell's route through the Riversdale area was recalled to memory when Dr. John Muir wrote the *Vegetation of the Riversdale Area.* This work formed Memoir No. XIII, and was published in 1929. In it he relates that many species discovered by Thunberg and Burchell have not been found by more recent collectors. Dr. Muir pays further tribute to Burchell in an article he wrote for *Die Huisgenoot* in 1928, under the title of *De Garcia Pass en William John Burchell.*

In Memoir No. XIV, dealing with *Forest-Succession and Ecology in the Knysna Region*, no mention is made of Burchell having been there, but his notes on trees found there are scattered in his *Catalogus Geographicus* and other manuscripts. Time permitting, I hope to piece them together some day: they may be of some historical interest. Their existence was known to Dr. Sim and Dr. Burtt Davy, for both refer to them in their publications.

No doubt in the course of time Burchell's entire route will be worked over by specialists doing intensive study in the various divisions of the Union. Just one hundred years after Burchell, Dr. Burtt Davy journeyed over the northern end of the traveller's trek and found practically no change in the vegetation from what was recorded in 1812.

All Botanists who have assisted in the compilation of that great botanical work "*Flora Capensis*," have worked through Burchell's herbarium and manuscripts so his material has been fully utilised and appreciated as can be realised from the Genus *Burchellia* (Rubiaceae) and numbers of species bearing his name.

The question may be raised as to what use his *Catalogus Geographicus* is to the present day botanist, for nomenclature has undergone many changes since his time. It would appear to be of no value to have the manuscript published : to be helpful it must be used in conjunction with the herbarium sheets, and that being so, it is of no immediate value to anyone who is unable to handle the sheets. It has occurred to me that it might be of service to work out the records of collections he made in the individual areas covered by our modern divisions, giving, by the help of the *Flora Capensis* the modern nomenclature to his numbers. The work would then be of use to those botanists working out the history of the changes taking place in any of these areas. Burchell's own opinion on the matter is :—

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* *S.A. Phil. Soc. Trans.* II, page 134. 1881.

> "The importance and practical utility of local catalogues, pointing out the natural stations and circumstances of the native plants, will, it may be supposed, increase in proportion as the science advances, and as the objects it embraces become more multiplied."*

The science of botany has advanced, and now in 1941, has reached a state of great specialisation, and it is a far cry from the days of the naturalist to that of the taxonomist, physiologist, morphologist and ecologist. But before these special divisions could come into being, someone had to do the pioneering. Hesse, perhaps unwittingly but nevertheless truthfully, prophesied that Burchell "laid the foundations for births of a different nature" than that of the taxonomist.

Though he would be considered in modern times a taxonomist, he stated his views on what he called geographical botany, and vegetable physiology, and pleaded for the establishment of a botanical garden in Cape Town. These matters will be considered in part four of this paper.

BIOGRAPHICAL NOTES.

The notes have been compiled for those mentioned in the paper only if they worked before or in the early part of the nineteenth century, and so may not be too well known to the average reader.

(21) **Truter, Pieter Jan** and **Somerville, William** were the leaders of an expedition sent in 1802, by Lieut.-Gen. Dundas, Acting Governor of the Cape of Good Hope, to Bechuanaland.

(22) **Willdenow, Carl Ludwig** (1765-1812), Professor of Botany, Berlin; among his works were *Bemerkungen uber die Gattung Aloë*—1811, and *Bemerkungen uber die Gattungen Brunia und Staavia.*

(23) **Jussieu, Antoine** (1748-1836), studied medicine at Paris : was admitted a member of the Academy of Sciences : was a great friend of Sir W. Hooker. Wrote *Genera Plantarum*, the principles of which were adopted and enlarged by De Candolle.

(24) **Gray, Asa** (1810-1888), curator of the Lyceum of Natural History, New York : became Professor of Botany at University of Michigan and then Fisher Professor of Natural History, Harvard. He travelled much and maintained a constant and friendly correspondence with scientists throughout the world.

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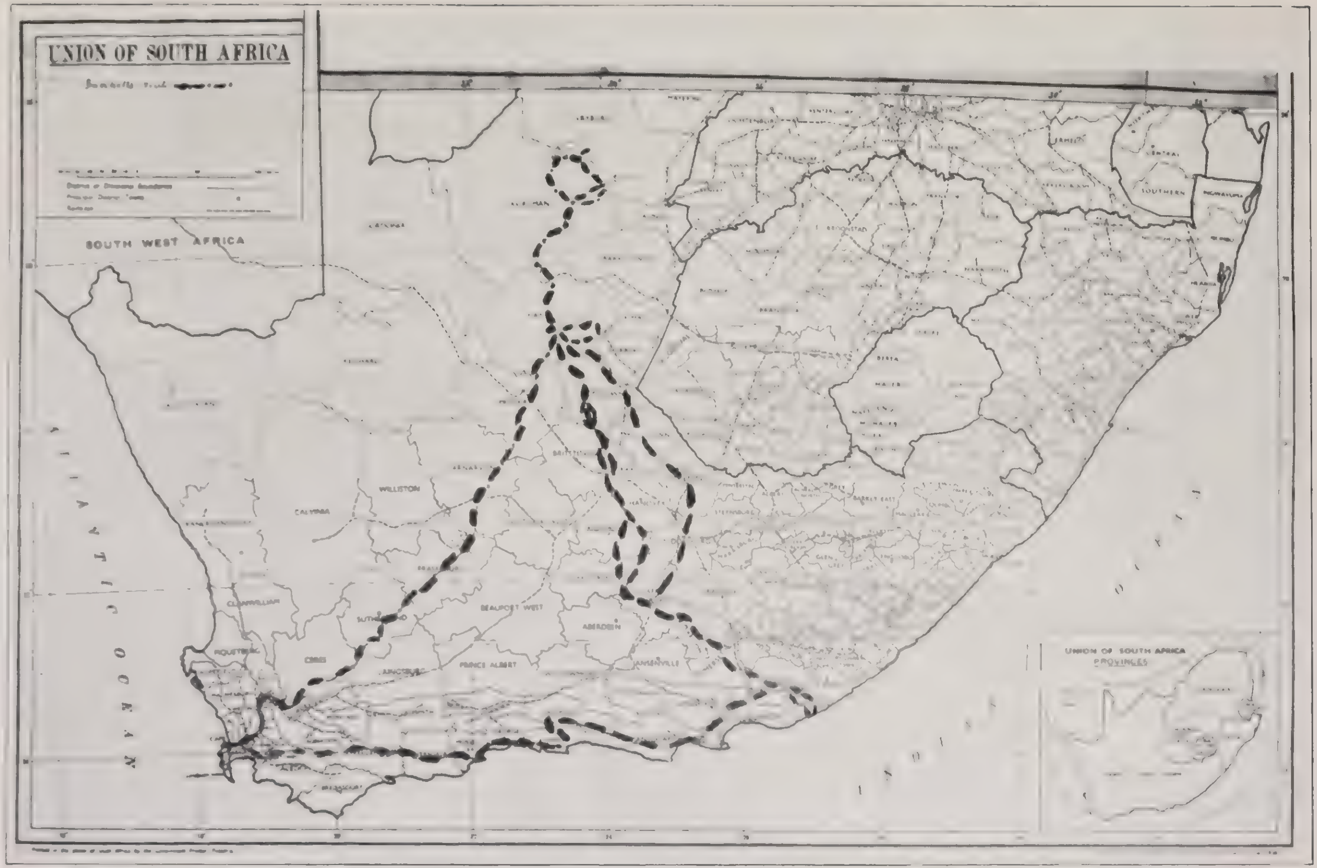
* *Travels.* I, page 154.

(35) Greville, Robert Kaye (1794-1866), botanist: settled at Edinburgh, 1816. F.R.S.E., 1821. LL.D. Glasgow in 1824. His collection of *algae* was acquired by the British Museum and that of flowering plants by Glasgow University.

(36) Haworth, Adrian Hardy (1767-1833), entomologist and botanist. He cultivated a great variety of succulent plants. His herbarium is incorporated with that of H. B. Fielding at Oxford.

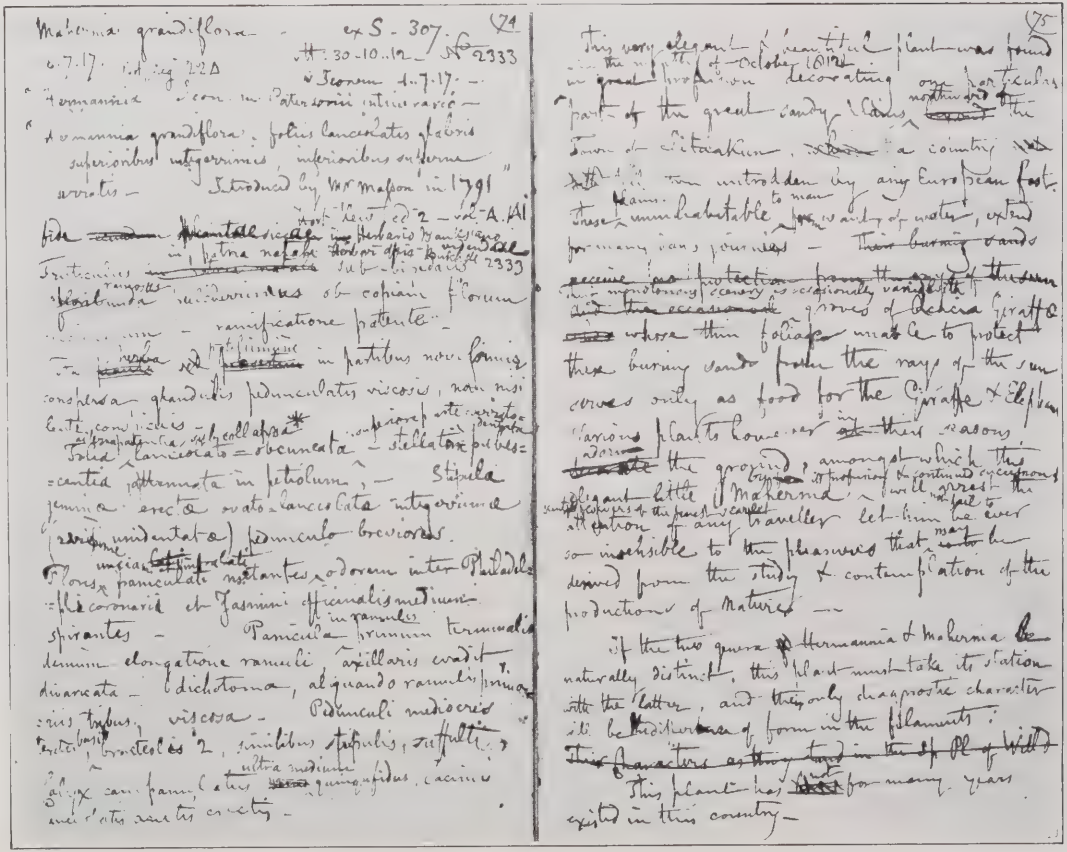
(37) Gray, Maria Emma (1787-1876), conchologist and algologist. Married John Edward Gray and assisted him in his scientific work in connection with the Natural History Department, British Museum. She was much attached to the study of *algae*: her own collection was bequeathed to the Cambridge University Botanical Museum.

PLATE V.



Map showing Burchell's Track in 1811-15. Photograph: James L. Smith, Johannesburg.

PLATE VI.



Mahernia grandiflora - ex S - 307. 74
c.7.17. [illegible] 22Δ fl: 30-10-12 - No 2333
Iconem 4.7.17. -
" Hermannia Icon. in Patersonii itinerario -
" Hermannia grandiflora: foliis lanceolatis glabris superioribus integerrimis, inferioribus superne serratis - Introduced by Mr Masson in 1791" Hort. Kew. ed. 2 - vol. 4. [illegible]
fide ~~plantae siccae~~ in Herbario Banksiano
Fruticulus [illegible] in petra nata [illegible] sub-bipedalis 2333
ramosus ~~floribunda~~ [illegible] ob copiam florum
[illegible] - ramificatione patente -
Tota herba [illegible] in partibus novis [illegible]
conspersa glandulis pedunculatis viscosis, non nisi
lente conspicuis - [illegible]
Folia lanceolato-obcuneata - stellato pubes-
-centia attenuata in petiolum, - Stipula
gemina erecta ovato-lanceolata integerrima
(raro unidentata) pedunculo breviora.
Flores paniculati nutantes, odorem inter Philadel-
-phi coronarii et Jasmini officinalis medium
spirantes - Panicula primum terminalis
demum elongatione ramuli axillaris evadit
divaricata - dichotoma, aliquando ramulis prima-
-riis tribus, viscosa - Pedunculi mediocres
erecti, basi bracteolis 2, similibus stipulis, suffulti.
Calyx campanulatus ultra medium quinquefidus, laciniis
[illegible] acutis erectis -

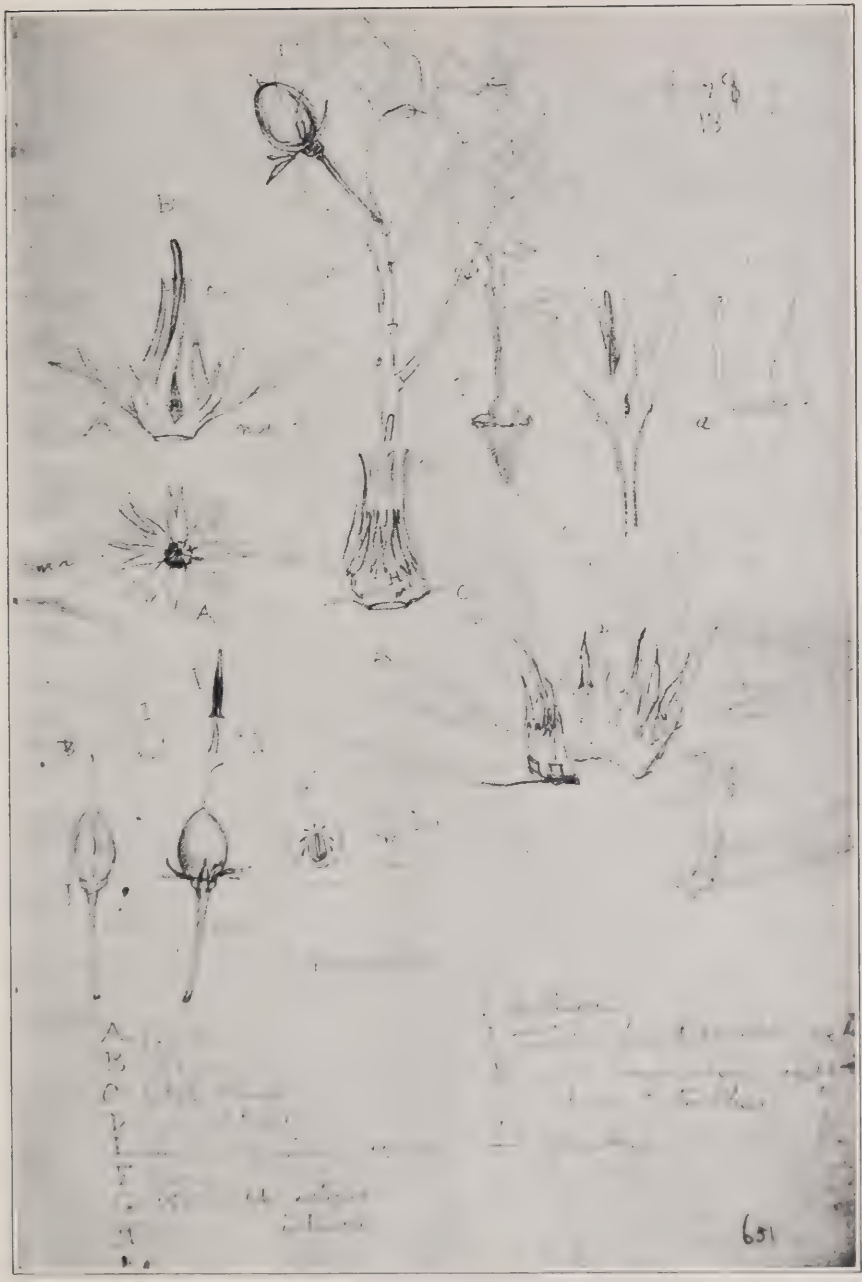
75
This very elegant & beautiful plant was found in the middle of October 1812 in great profusion decorating one particular part of the great sandy Plains northward of the Town of Litakun, a country till then untrodden by any European foot. These Plains, uninhabitable to man for want of water, extend for many days journey - ~~Their burning sands receive no protection from the rays of the sun~~ their monotonous scenery is occasionally varied with ~~and the occasional~~ groves of Acacia Giraffae whose thin foliage unable to protect these burning sands from the rays of the sun serves only as food for the Giraffe & Elephant. Various plants however in their seasons adorn the ground, amongst which this elegant little Mahernia by its profusion & continued succession of flowers & the finest scarlet will not fail to arrest the attention of any traveller let him be ever so insensible to the pleasures that may be derived from the study & contemplation of the productions of Nature. -

If the two genera Hermannia & Mahernia be naturally distinct, this plant must take its station with the latter, and the only diagnostic character will be the difference of form in the filaments: ~~The characters as they stand in the Sp. Pl. of Willd.~~

This plant has not for many years existed in this country -

Two pages from Ephemeris MS. of Burcheli.
Reproduced by courtesy of the Director of the Royal Botanic Gardens, Kew.

PLATE VII.

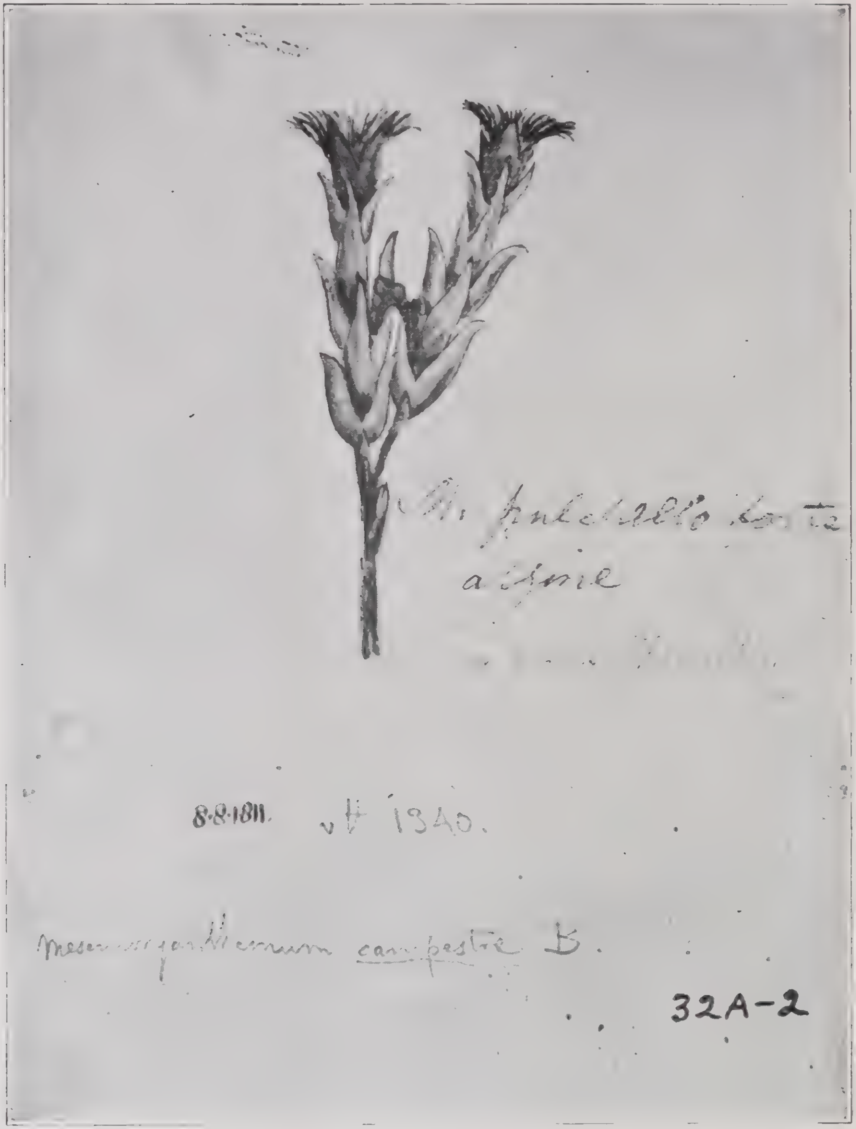


Mimusops. At Kowie Station, 28.9.1813

Drawing: Wm. J. Burchell.

Copyright by The Gubbins Trustees.

Photograph: James L. Smith, Johannesburg



M. pulchello forte
affine

[illegible]

8·8·1811. v‡ 1340.

Mesembryanthemum campestre B.

32A-2

Drawing: Wm. J. Burchell.

Copyright by The Gubbins Trustees.
Photograph: James L. Smith, Johannesburg.

PLANTAE NOVAE AFRICANAE.

"Ex Africa semper aliquid novi."—*Pliny*.

SERIES XVI.

By

Mrs. M. R. Levyns, Paymaster-Captain T. M. Salter, R.N. (Ret.),
Miss E. E. Esterhuysen and Miss G. J. Lewis.

Aniserica macrocalyx Salter. (Ericaceae—Ericoideae.)

Frutex erectus, 30—45 cm. altus, ramis ramulisque pubescentibus. *Folia* 3-nata, linearia vel angustissime ovata, 2—5 mm. longa, plus minusve ciliata. *Flores* capitati, cumulatim congesti, nunc solitarii, nunc 2—3-nati, pedunculis pedicellisque brevissimis : capitula foliifera, 4—6 mm. in diam. *Bractea* 1. *Calyx* fere 2 mm. longus, receptaculo basale turgido, obovoideo vel obconico, tubo fere aequante : tubus tubulatus, albus, superne leviter ampliatus, lobis erectis brevibus, late ovato-deltoideis. *Corolla* alba, infundibuliformis, leviter inflata, lobis 2 brevibus, conniventibus. *Antherae* non aristatae.

Erect, densely branched, 30—45 cm. high, the branches and branchlets more or less pubescent. *Leaves* 3-nate, usually spreading, longer than the internodes, including the ciliate petiole, 2—5 mm. long, linear, linear-oblong or very narrowly ovate, subobtuse, subterete, ciliate with long hairs especially when young, densely but minutely cano-puberulous within the dorsal groove. *Flowers* in dense globose or ovoid terminal clusters of 8—40 flowers, the clusters compound, leafy, 4—6 mm. in diam., the flowers 2—3-nate on very short peduncles or more rarely solitary in the axils of the floral leaves, very shortly pedicellate. *Bract* 1, minute. *Calyx* glabrous, about 2 mm. long, with an obconic or obovoid fleshy receptacle at the base, about as long as the tube : tube tubular, widening slightly towards the throat, including the widely ovate-deltoid erect teeth, 0·9—1·2 mm. long, nerveless, whitish, not coriaceous. *Corolla* glabrous, white, 2·5 mm. long, funnel-shaped, oblique, slightly inflated, the two short obtuse lobes connivent. *Anthers* exserted, linear-oblong, bifid, basifixed, spurless, about 0·8 mm. long, the pore ¼—⅓ the length of the cell. *Ovary* glabrous, seated within a slight depression at the top of the receptacle. *Style* exserted ; stigma simple, minute.

Hab. Cape Peninsula : Constantiaberg, at the base of damp ledges, facing south-west, at about 2,300 ft., *Pillans* 9518 (*type* in Bolus Herbarium) ; Noordhoek Peak, in a similar situation, *Esterhuysen* 3850 : Cape Province : Worcester Div., Bain's Kloof, *Compton* 5655, which has a slightly shorter receptacle, appears to be this species.

Differs from *A. gracilis* (Bartl.) N.E. Br., the only other species in this genus, in the elongate calyx, the ovary being superimposed upon a solid fleshy obconic or obovoid "receptacle," nearly as long as the free part of the calyx (Fig. 1), and in the constantly unibracteate pedicels. The flowers appear to be constantly whitish. The generic definition of the genus Aniserica, which is said to be without bracts (although they are actually sometimes present in *A. gracilis*) should therefore be amended in this respect.

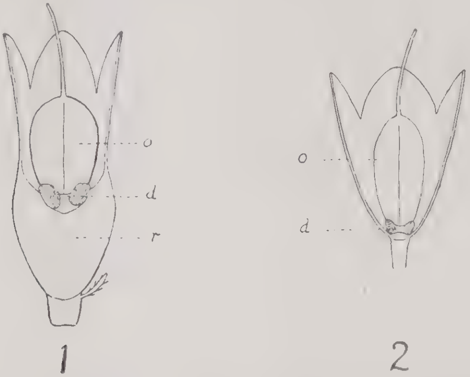


FIG. 1. 1. Vertical section through calyx of *Aniserica macrocalyx* Salter : *o.* ovary ; *d.* disc ; *r.* fleshy receptacle. 2. Do. of *A. gracilis* (Bartl.) N.E. Br. Both × 20 *Del.* T. M. Salter.

The well developed fleshy body at the base of the calyx, here called the receptacle, seems to be unique in the sub-family Ericoideae.

The first discovery of this new species in the Cape Peninsula was made by Miss E. Esterhuysen.

Disa Salteri Lewis sp. nov.

Tuber circa 2 cm. longus, 1·3 cm. diam. Planta 15—25 cm. alta, caule firmo, sat flexuoso, erecto. Folia radicalia hysterantha, 3 vel 4, linearia, acuminata, semiconduplicata, ad 8 cm. longa (petiolo incluso), 3 mm. lata ; folia caulina 5, brunnea, membranacea, acuta vel acuminata, per dimidiam longitudinis vel ultra caulem circumfusa, 2·2—1·1 cm.

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longa. Inflorescentia secunda, compacta, 4—10-flora. Bractea brunnea, membranacea, acuminata, 5—8 mm. longa. Flores galbanae, brunneae atro-maculosae ; sepala 2 lateralia oblonga, acuta, 4 mm. longa ; sepalum tertium galeatum, calcare cylindrico, angusto, 2·5—2·8 cm. longo ; petala 2 lateralia forma sub-quadrata, obtusa, 2·5 mm. longa ; petalum tertium lineare, obtusum, 3—4 mm. longum, 1 mm. latum. Anthera pone stigma, transverse posita ; pollinia glandulae adjunctae sed facile divisae. Stigmata rotunda excavata, viscosa. Ovarium 1 cm. longum, 2 mm. diam.

Cape Peninsula, sandy slopes south of Rooi Hoogte near Smitswinkel, on recently burnt ground. Salter 8356 (type, in S.A.M.) ! Flats West of Paulsberg, Salter 5244 (B.H.) !

Flowering season, end of April to May.

Disa Salteri is quite distinct from any of the species at present described. It seems most nearly related to *D. ferruginea* with which it agrees in having hysteranthous leaves, the cauline leaves closely sheathing, half membranous, and the long flower spur. It differs, however, in having a less dense and secund inflorescence, the sepals and petals obtuse or nearly obtuse and spreading, the very much longer spur in proportion to the size of the flower, and in the colour of the flower.

Superficially it seems to somewhat resemble *Amphigenia tenuis*, with which it was found growing, as the colouring of the flowers, the stem, bracts and cauline leaves are almost identical. It is distinct, however, in having the pollinia glands separate, although adjoining and appearing almost fused, the side sepals not reflexed and the odd sepal galeate and with a long spur far exceeding the flower in length.

This rare species has up to the present only been found on recently burnt ground and is difficult to discern, the slender brown stem and small brownish-yellow flowers closely resembling the burnt remains of the *Restios* and other plants among which it grows. It is found at an altitude of about 500 ft., the tuber embedded in the roots of a *Restio*.

The specific name is in honour of Paymaster-Captain T. M. Salter who first found one plant a few years ago. Since then he has constantly searched for it and was rewarded by finding about a dozen plants this year on a piece of country which had recently been burnt.

Tuber about 2 cm. long, 1·3 cm. diam. Plant 15—25 cm. high ; stem firm, slightly flexuose. Basal leaves hysteranthous, 3 or 4, linear, acuminate, semiconduplicate, up to 8 cm. long (including petiole), 3 mm. broad ; petioles enclosed in 2 brown, membranous, acute or obtuse sheaths ; cauline 5, brown, membranous, acuminate, 5—8 mm. long. Flowers yellow-green, mottled with dark brown ; 2 side sepals oblong, acute, 4 mm. long ; odd sepal galeate, spurred, spur cylindrical, narrow,

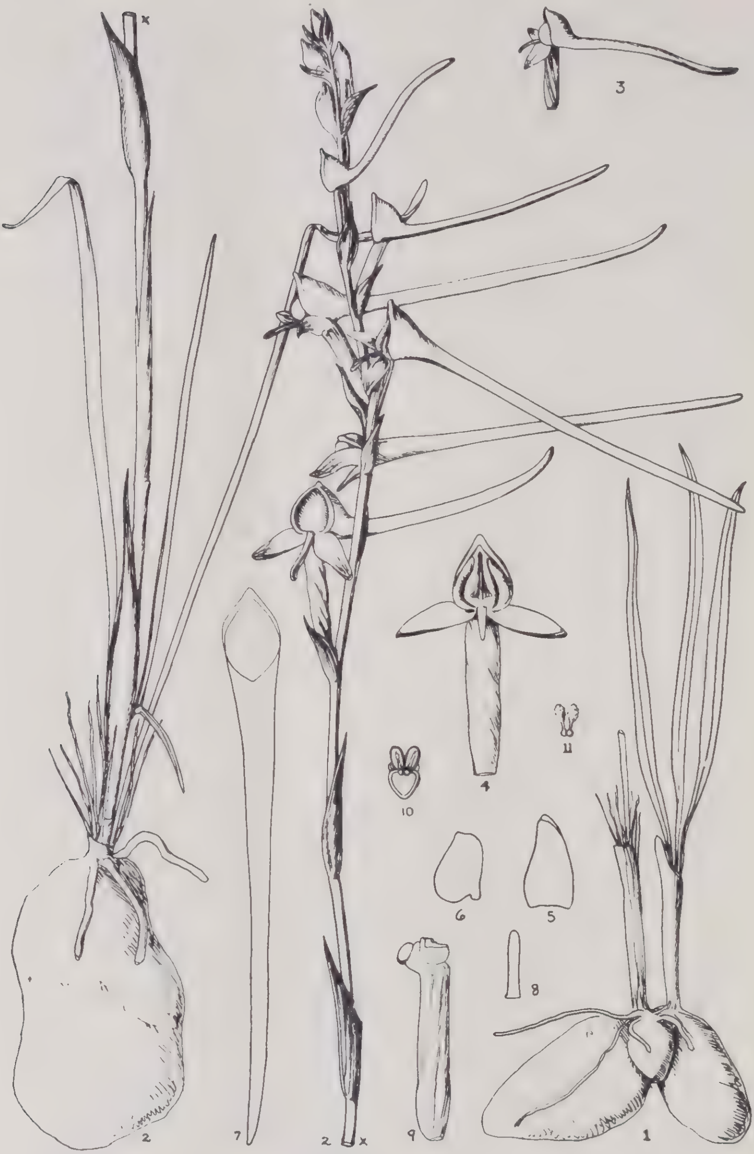

FIG. 2. *Disa Salteri* Lewis. 1. Plant in leaf × 1. 2. Plant in flower (2 sections) 2. 3. Flower × 1. 4. Flower, front view × 2. 5. Side sepal × 3. 6. Side petal × 3. 7. Odd sepal and spur × 3. 8. Odd petal × 3. 9. Ovary, column and stamen × 3. 10. Stigma and anther × 3. 11. Pollinia × 3.

2·5—2·8 cm. long; odd petal linear, obtuse, 3—4 mm. long, 1 mm. broad. Stamen behind stigma, at right angles to ovary; pollinia glands adjoining but separating readily. Stigma a small, circular, viscid hollow at apex of ovary. Ovary 1 cm. long, 2 mm. diam.

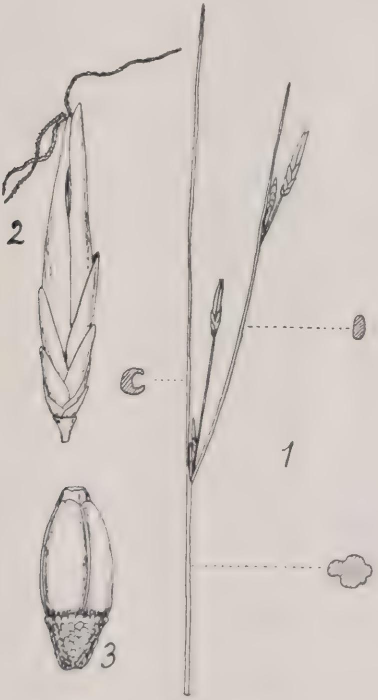

FIG. 3. *Epischoenus gracilis* Levyns. 1. Inflorescence: sectional views (enlarged) of the axis and lower bract are shown × 2. 2. Spikelet × 10. 3. Fruit × 15.

Epischoenus gracilis Levyns.

Herba perennis, caespitosa, glabra, caulibus leviter sulcatis. Folia omnia basalia, lamina minuta vel O. Inflorescentia laxa, spiculis 4—6 instructa. Bractea inferior inflorescentia longior. Spiculae circiter 10 mm. longae, complanatae. Glumae infimae 6—8 vacuae. Nux oblonga vel elliptica, trigona, pallida, lucida, disco ruguloso.

A densely tufted plant, pale green in colour, about 90 cm. high. Stems very slender and wiry, faintly grooved. Leaf sheaths a deep red at the base, often paler in colour higher up, firm in texture, lamina absent or nearly so. Lowest bract overtopping the lax inflorescence, about 3 spikelets in the axil of this bract with pedicels of differing lengths, one spikelet almost sessile ; the axis continuing beyond the first bract to a second which bears spikelets similar to those of the first. Spikelet a little less than 10 mm. in length, flattened, narrow, pale brown, the bracts firm in texture ; 6—8 sterile bracts at the base, then 1 or 2 with male flowers in their axils, each with an abortive gynoeceum, finally a bisexual flower, the axis continuing beyond this and enlarging in fruit. Stamens 3. Style branches 3. Fruit pale in colour and shining, oblong or ellipsoidal, trigonous, with the thickened base of the style above, and a stout, rugose, supporting disc at the base.

Type. Levyns 7389, Biesievlei, Jonkershoek, Stellenbosch.

Hab. Moist places in the valley, forming a dense community with *Psoralea aphylla, Berzelia lanuginosa*, · *Carpha glomerata, Cliffortia graminea* and others.

This is a much more slender plant than *E. quadrangularis* C.B. Cl., though with the same general habit. The laxly borne spikelets, some of them with very slender pedicels, and the fruit distinguish this species from what has hitherto been the only species in the genus. In the Flora Capensis C. B. Clarke describes the fruit of *E. quadrangularis* as being marble-white. This, however, is incorrect as the white colour is only found in fruits which do not contain a fertile seed. Fertile fruits are brown in colour, shining, and are crowned by a black area with a matt surface. The basal disc has not the rugosities of the present species.

Erica calycina L., var. **longibracteata** Esterhuysen and Salter, var. nov. § Eurystoma.

Planta erecta compacta, ad 35 cm. alta. *Rami* virgati, erecti, juniores tomentoso-puberuli, internodis fere 5—7 mm. longis : ramuli ternati, adscendentes, dense imbricati, puberuli, plerumque 1·5—2 cm. longi, superiores gradatim breviores. *Folia* 3-nata, linearia, imbricata, plus minusve adscendentia, anguste sulcata (petiolo incluso) 3—5 mm. longa. *Inflorescentia* spiciformis : flores copiosi, 3-nati, ramulos terminantes. *Pedunculi* puberuli, fere 2 mm. longi : bracteae adnatae, basin versus subscariosae et minute ciliatae, superiores lanceolatae, 2·5 mm. longae, inferior 3·5—4 mm. longa, e basi ovata superne foliacea. *Sepala* ovata, scariosa, alba, attenuate viridi-carinata, 3·5—4 mm. longa. *Corolla* late campanulata, alba, 3 mm. longa, segmentis ovatis reflexis, basi imbricatis, pallidissime virescentibus, tubo aequantibus vel paulum longioribus. *Stamina* vix exserta : antherae basifixae, castaneae, breviter cristatae, vix 1 mm. longae, fere ad basin bipartitae, poris $\frac{1}{2}$—$\frac{3}{4}$ loborum oblongorum. *Ovarium* globosum, in dimidio superiore pubescens, stylo antheris aequante, stigmate vix ampliato.

Hab. Cape Peninsula: Table Mountain; in moist shady places in the upper part of Jubilee Ravine, *Stokoe* 7378 (*type* in Bolus Herbarium); ravine west of Myburgh's Waterfall Ravine, *Stokoe* 7377; above Newlands, *Esterhuysen* 3506. Altitude about 2,000 ft. Flowers Sep.—Oct.

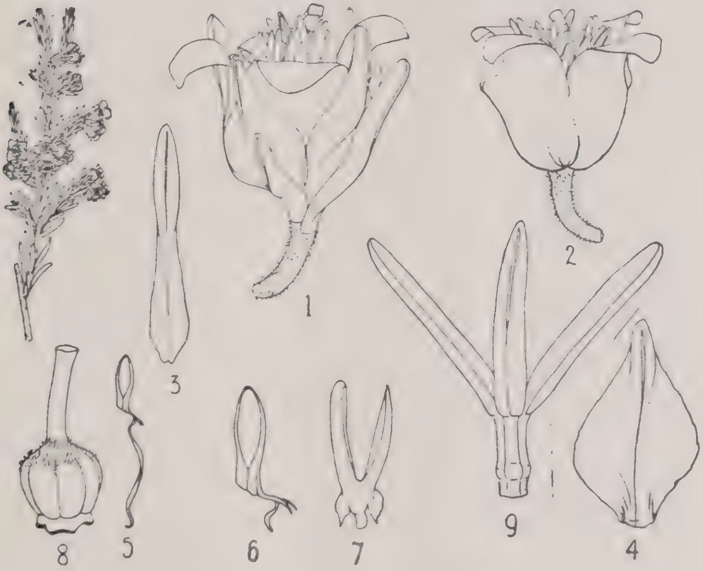

Fig. 4. *Erica calycina* L. var. *longibracteata* Esterhuysen and Salter. Natural size. 1. Flower × 10. 2. Flower with calyx and bracts removed × 10. 3. Lowest bract × 10. 4. Sepal × 10. 5. Stamen × 10. 6. Anther, side view × 20. 7. Anther, back view × 20. 8. Gynaecium × 10. 9. Whorl of leaves × 10.

A distinct variety of *E. calycina* and smaller in all parts. It differs principally from the typical form in having unequal adnate bracts, the lowest being much longer than the upper pair, in the proportionately longer and narrower sepals, smaller corolla and chestnut-brown, not dark brown anthers. The very pale greenish tinge of the upper surface of the corolla segments and the plainly visible green tips of the sepals give the whole flower a distinctly green appearance.

Gnaphalium Dodii Levyns.

Frutex ramosissimus, lanatus. Folia supra glabra, infra lanata. Capitula glomerata. Involucri bracteae imbricatae, erectae, scariosae, intimae apicibus albis, obtusis. Flores c. 25. Ovarium minute papillatum.

A much branched sprawling shrub, up to about 1 m. high. Stems densely woolly and white when young, becoming glabrous with age and ribbed. Leaves elliptical or obovate, acute, glabrous and green above, densely woolly and white below, variable in size, some leaves exceeding 1 cm. in length but usually less. Capitula shortly stalked, in clusters near the ends of the branches. Involucral bracts in several rows, erect, the outer woolly and ovate, gradually becoming less woolly and linear-oblong, the innermost white tipped and obtuse. Receptacle without bracts. Flowers about 25, the majority female and slender, the central ones bisexual. Pappus as long as the corolla. Corolla white. Ovary with very short, scattered papillae.

Found in sheltered places on Table Mountain.

Type. Levyns 6369, Orange Kloof, about 1,100 ft. Also collected by Wolley Dod (No. 1946) above Groote Schuur. Flowering season: Nov.-Dec.

This species much resembles *Helichrysum serpyllifolium* (Berg) Less. in appearance and has been taken for that plant. It may be readily distinguished, however, by the much larger number of flowers and the excess of female flowers over bisexual ones, the latter character being the sole reason for placing it in Gnaphalium. The boundary between Gnaphalium and Helichrysum is an arbitrary one, but the advantages of upholding the two genera outweigh other considerations. This species is one of the border line cases.

Helipterum brachypterum Levyns.

H. speciosissimo (L) DC. affinis sed aliter pedunculis, pedunculorum squamis, bracteis albis vel roseis, et setis breviter plumosis differt.

An erect undershrub up to 50 cm. in height, simple or sparingly branched. Leaves rather crowded, lanceolate, densely woolly on both surfaces, the midrib prominent below. Vegetative axes usually terminated by several peduncles arising together and covered with ovate, acuminate, chaffy scales, each peduncle bearing one many-flowered capitulum, about 4 cm. in diam. Involucral bracts in many rows, spreading, the majority acute, the innermost shorter and somewhat obtuse, white, usually flushed with pink. Pappus bristles shortly feathered, most of the lateral branches lying in one plane but near the tip becoming shorter, thicker and radially symmetrical, bristles shortly and irregularly united at the base. Corolla reddish purple. Ovary covered with very short, bladder-like hairs, faintly angled.

Type. Bolus 9868 (in the Bolus Herbarium) from Houw Hoek.

Other specimens are: Levyns 6807, Klasjagersberg, Cape Peninsula; Stokoe 6757, Hottentot's Holland; Schlechter 5466, Houw Hoek; Gillett 979, near Hermanus.

It is probable that *H. speciosissimum* DC. var. *polycephalum* Harv. is the same plant but I have been unable to compare this species with specimens quoted by Harvey. The epithet *polycephalum* is occupied in Helipterum.

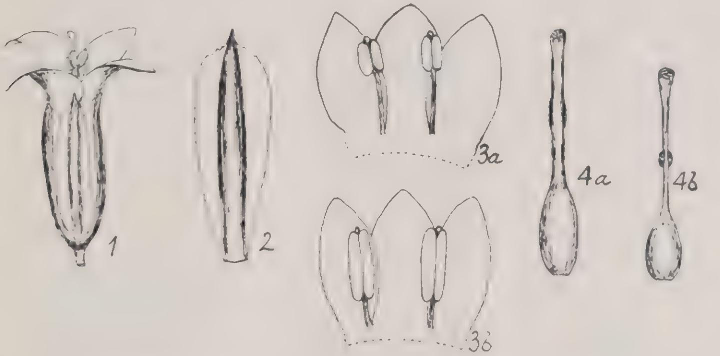

FIG. 5. 1. *Sebaea paludosa* Levyns. Flower × 7. 2. *S. paludosa* Inner sepal × 10. 3. Three corolla lobes and two stamens from buds just ready to open: *a. S. paludosa*; *b. S. aurea* × 10. 4. Gynaecium: *a. S. paludosa*; *b. S. aurea* × 10.

Sebaea paludosa Levyns.

Herba annua, c. 22 cm. alta, gracilis. Caulis simplex vel pauciramosus. Folia sessilia, ovata vel cordata. Flores lutei. Sepala 4, segmentis dorso carinatis, marginibus hyalinis. Stamina 4, corollae in faucibus inserta; antherae 1 mm. longae; filamenta 2 mm. longa. Ovarium 2·3 mm. altum; stylus 4 mm. altus, medio callis inconspicuis instructus.

A glabrous annual about 22 cm. high, usually simple but occasionally with a few branches near the base, with 2—7 pairs of leaves, internodes much longer than the leaves. Leaves ovate or cordate, sessile, somewhat acute. Inflorescence rather lax, flowers yellow, pedicels 1·5—3 mm. long. Sepals 4, about 4 mm. in length, with a rounded, green keel and translucent, membranous margins, sometimes the margins slightly toothed near the apex, acute. Corolla lobes 4, a little shorter than the tube which equals the calyx in length. Stamens attached at the point of separation of the corolla lobes, about four fifths of the length of the lobes at the time of dehiscence, filament much longer than the anther, anther with a gland at the apex. Ovary ellipsoidal, its length one third, or a little more, of the whole gynoeceum. Style with two inconspicuous, median, glandular areas. Stigma obscurely bilabiate.

Type. Levyns 7334, Olifants Bosch, Cape Peninsula (Bolus Herbarium). Other collections : Levyns 5284, Buffels Bay ; Levyns 5309, top of Redhill.

Hab. Marshy places, growing among reeds.

Flowering season. Oct.—Dec.

Closely related to *Sebaea aurea* R.Br. from which it differs in its more elongated habit, its more prominent keel on the sepals, its relatively shorter corolla lobes, its smaller anther lobes and long filaments its less conspicuous glandular area on the style and the general proportions of the gynoeceum (Fig. 5).

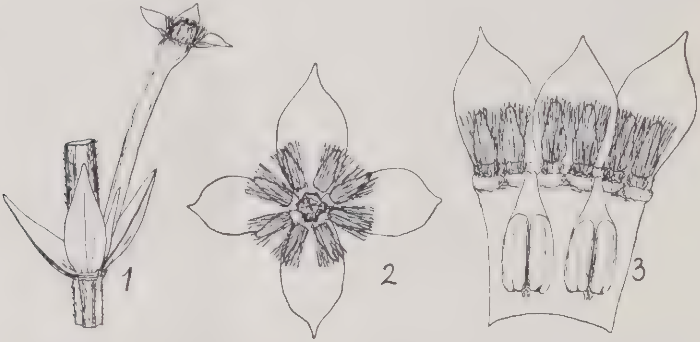

Fig. 6. *Struthiola Salteri* Levyns. 1. A node and portions of two internodes of a flowering axis × 3. 2. Bird's-eye view of a flower showing the shape of the perianth segments and the squamae × 10. 3. Part of the upper part of the perianth tube opened out to show the relation of the stamens to the other parts : taken from a bud just about to open × 10.

Struthiola Salteri Levyns.

Frutex parvus, virgatus, ramosus. Caules juvenes hirsuti. Folia ovata, glabra, verticillato-ternata. Perianthii tubus gracilis, supra parum dilatatus, albus, glaber. Squamae 8, carnosae, erectae, flavae, villis amplexae.

A low, divaricately branched shrub, from 30—40 cm. in height. Bark of the old stems reddish brown, with prominent leaf scars. Young stems with a raised, hairy portion running down from each leaf base to the next node, the rest of the surface glabrous or nearly so. Leaves usually borne in whorls of three, occasionally four, sessile, loosely imbricate, glabrous, ovate, acute or acuminate, veins not conspicuous, light green in colour. Flowers numerous, one in the axil of each of the upper leaves, white. Bracts 2, linear, acute, dark at the tips, keeled, wrapping round the base of the perianth, about four fifths the length of the subtending leaf. Perianth with a slender tube, glabrous outside, about 12 mm. long, widening slightly near the top, with 4 ovate-oblong lobes which taper to a sharp point, the two outer lobes more pointed than the inner. Squamae 8, fleshy, narrowly ovoid, yellow, half the length of the perianth segments or a little shorter, surrounded by stiff, white hairs which slightly exceed them in length. Anthers with a conspicuous, more or less triangular connective, truncate or emarginate at the tip. Filament very short. Style about two thirds the length of the perianth tube. Stigma capitellate, covered with sparse, radiating hairs. Ovary glabrous, seated in a small, 4-lobed, glandular cup.

Hab. Open bushy places from Buffels Bay to Cape Point, locally frequent.

Flowering season. June to Nov.

Type. Salter 8348, the North slopes of Vasco da Gama Peak (Bolus Herbarium).

This species is closely allied to *Struthiola dodecandra* (L.) Druce (= *S. erecta* L.) from which it differs in its more bushy habit, the hairs on the branches, the whorled, ovate leaves, the wider base of the perianth lobes, the yellow colour of the squamae, and the longer hairs surrounding the squamae.

THE GENUS PLAGIOCHLOA.

By R. S. ADAMSON and T. A. SPRAGUE.

A new generic name, *Plagiochloa* Adamson and Sprague, is here proposed for a group of South African species included in *Demazeria* Dum. by Bentham and Hooker (Gen. Pl. iii. 1194 : 1883), Hackel (Engl. u. Prantl, Nat. Pflanzenfam. ii. Abt. 2, 72 : 1887), and Durand and Schinz (Consp. Fl. Afr. v. 900 : 1895). The inclusion of these South African species in the same genus as a Mediterranean one (*Demazeria sicula*) should not necessarily be viewed with suspicion on phytogeographical grounds since the existence of a common element in the Mediterranean and Cape floras is well known. However, the southern group of species exhibits a number of morphological differences. The spikelets are less compressed, have fewer flowers, 3—10 instead of 8—15, are less regularly alternate, always oblique to the axis, and shortly stalked not sessile. The whole inflorescence is less regular and commonly lobed or branched.

In the present state of our knowledge these morphological differences taken in conjunction with the different geographical ranges suggest the advisability of following Stapf's classification (Dyer, Fl. Cap. vii. 701 : 1900) of the South African species of *Demazeria* in an independent genus. This genus, as delimited by Stapf, was actually new, and should have received a new generic name. Stapf, however, in the desire of avoiding changes in currently accepted nomenclature, unfortunately adopted the old generic name *Brizopyrum* for his new genus, attributing it to " Nees (in part, not of other authors)." Actually Nees did not propose a genus *Brizopyrum* : what he did was to include the South African species concerned in *Brizopyrum* Link, from which Stapf subsequently segregated them. Since *Brizopyrum* Link was based on *Cynosurus siculus* Jacq. the type-species of *Demazeria* Dum., it is an absolute synonym of *Demazeria* Dum., and cannot legitimately be applied to any other genus. A new name is accordingly required for the genus called *Brizopyrum* by Stapf, and the name *Plagiochloa* is here adopted, in allusion to the oblique position of the spikelets.

Plagiochloa Adamson and Sprague, nom. nov. — *Brizopyrum* " Nees partim " sec. Stapf in Dyer Fl. Cap. vii. 701 (1900) ; non Link.

Generally tufted grasses, perennial or less often annual. Leaves flat or rolled, with a ligule of hairs. Inflorescence spicate, often one-sided, either simple or with contiguous lateral spikes at the base. Spikelets shortly stalked, erect but oblique to axis, compressed, 3—10 flowered rarely more. Flowers projecting beyond the glumes at least in the later stages. Glumes firm, acute or mucronate, 4—5 veined. Lemmas 5—9 veined, generally with stout hairs in the lower parts. Stamens 3. Ovary glabrous, obtuse. Hilum in fruit minute. Stigmas projecting laterally from spikelet.

Type-species: *P. Uniolae* (L.f.) Adamson and Sprague (*Cynosurus Uniolae* L.f.).

As thus defined, *Plagiochloa* is closely related to another South African genus, *Lasiochloa* Kunth (Rév. Gram. ii. 555: 1829). The affinity with *Lasiochloa* is, indeed, closer than with *Demazeria*. While most of the commoner species are readily separated by the form of the inflorescence and the structure of the spikelet, there are some that seem to unite the characters or both genera; an example is the plant known as *Brizopyrum ciliare* Stapf.

Pending a complete study of this whole group of grasses, the genera are kept separate.

The following new combinations are needed in the genus :—

1. Plagiochloa Uniolae (L.f.) Adamson and Sprague, comb. nov.
Cynosurus Uniolae L.f. Suppl. 110 (1781).
Poa Uniolae (L.f.) Schrad. in Goett. Anz. 1821, iii. 2074.
Demazeria Uniolae (L.f.) Kuntze, Rev. Gen. iii. sect. 2, pt. 2, 349 (1898).
Cynosurus paniculatus Thunb. Prodr. Pl. Cap. 23 (1794).
Triticum capense Spreng. Pug. ii. 23 (1813).
Brizopyrum capense (Spreng.) Nees, Fl. Afr. Austr. 372 (1841).
Desmazeria capensis (Spreng.) Hack. in Bull. Herb. Boiss. sér. 1, vii. 27 (1899).
Briza imbricata Steud. in Flora xii. Band 2, 489 (1829).

Plagiochloa Uniolae should not be confused with *Eragrostis Uniolae* Nees, a South American species, now transferred to *Briza*. *Eragrostis Uniolae* was erroneously included by Kuntze (l.c.) in the synonymy of *Demazeria Uniolae*.

Desmazeria composita Hack. (Bull. Herb. Boiss. sér. 1, vii 27 (1899) differs from the above species only in having a short compact compound spike with a glabrous axis; lemmas more densely hairy; and more obtuse paleas. In view of the great polymorphism of the species, it seems scarcely justifiable to maintain this as a separate entity.

2. Plagiochloa acutiflora (Nees) Adamson and Sprague, comb. nov.
Brizopyrum acutiflorum Nees Fl. Afr. Austr. 371 (1841).

Desmazeria acutiflora (Nees) Dur. et Schinz, Consp. Fl. Afr. v. 900 (1895).

Plagiochloa acutiflora should not be confused with *Eragrostis acutiflora* (H.B.K.) Nees, a native of Central and South America.

3. Plagiochloa oblitera (Hemsl.) Adamson and Sprague, comb. nov.

Demazeria oblitera Hemsl. in Rep. Voy. Challenger, Bot. i. pt. 2, 90, t. 51, fig. 1—8 (1885).

Brizopyrum obliterum (Hemsl.) Stapf in Dyer Fl. Cap. vii. 703 (1900).

4. Plagiochloa glomerata (Stapf) Adamson and Sprague, comb. nov.

Brizopyrum glomeratum Stapf in Hook. Ic. xxvii. t. 2603 (1899).

Poa glomerata Thunb. Prodr. Pl. Cap. 22 (1794); non Walt. Fl. Carol. 80 (1788).

5. Plagiochloa brachystachya (Nees) Adamson and Sprague, comb. nov.

Brizopyrum capense var. *brachystachyum* Nees Fl. Afr. Austr. 373 (1841).

Brizopyrum brachystachyum (Nees) Stapf in Dyer, Fl. Cap. vii. 707 (1900).

6. Plagiochloa alternans (Nees) Adamson and Sprague, comb. nov.

Brizopyrum alternans Nees Fl. Afr. Austr. 369 (1841).

Demazeria alternans (Nees) Dur. et Schinz, Consp. Fl. Afr. v. 900 (1895).

7. Plagiochloa ciliaris (Stapf) Adamson and Sprague, comb. nov.

Brizopyrum ciliare Stapf in Hook. Ic. xxvii t. 2602 (1899).

Dactylis ciliaris Thunb. Prod. Pl. Cap. 22 (1794); non L. Mant. ii. 185 (1767).

NOTES ON SOME CAPE PENINSULA SPECIES OF *ANTHERICUM*.

By R. S. ADAMSON.

The genus *Anthericum* is one that is much in need of careful study and revision and one that has been much neglected by botanists. In 1872 Baker (Journ. Bot. 1872, 99) wrote "*Anthericum* is a genus . . . at present in a state of great confusion in books and herbaria." His statement is almost equally applicable to-day though Baker's work (l.c.; J. Linn. Soc. Bot. XV, 1875; Fl. Cap. VI. 378, 1896), cleared up some of the difficulties. Since Baker's time very little has been done. A. Duthie (Ann. Univ. Stell. IV. A. 1, 1926) published descriptions of the 13 species found on the Stellenbosch Flats of which, 10 belong to *Anthericum* and 3 are referable to *Chlorophytum*. The late Professor C. E. Moss commenced a study of the S. African species but his work was never brought to a conclusion. In much of what follows his notes and observations have been of very great assistance.

Many of the original descriptions were based upon plants grown in cultivation and often type specimens have not been preserved. Of the older specimens that exist many are poor and not at all easily identified. Baker (l.c.) examined the material in Thunberg's herbarium and made use of this in his elucidation of Thunberg's very short diagnoses. For real progress it is essential that field study go along with work in the herbarium. The plants do not dry easily and all have short lived flowers that open for a part of the day only. Many of the characters that were relied upon by the earlier writers have proved to be of little value for specific determination. Descriptions of varying lengths of stamens, for example, are the result of the age of the flower examined. The length of the leaf and its relation to that of the inflorescence is very much a matter of season and of habitat and varies considerably in any one species. Again, in most of the hairy species there is variation in the degree of hairiness, and glabrous or almost glabrous forms are found which are identical in all other characters. On the other hand some features which were not much noted by the older writers seem of definite value; among these are the root system, and the shape, and size of the bracts. While the structure of the flower is very uniform, the shape, colour, and texture of the perianth are often diagnostic.

Owing to war conditions it has not been possible to consult collections in Europe and in what follows allowances must be made in consequence.

On the Cape Peninsula Bolus and Wolley-Dod (Trans. S. Af. Phil. Soc. XIV. 340. 1903), record 15 species. Of these several are open to question either in identification or nomenclature or both.

A. REVOLUTUM L.

A. revolutum L. was described (L. Sp. Pl. 310 1753) as follows :—

> " A. foliis planis, scapo ramoso, corollis revolutis. Asphodelus foliis compressis asperis, caule patulo. Tournef. Inst. 343 Hab. . . . . ♃ "

The description was repeated by Linné unchanged in his second edition (L. Sp. Pl. ed. 2.445.1763). There is no specimen named by Linné himself in the Linnean herbarium.

The above meagre description can be applied to two very common Cape species, both of which have branched inflorescences and a recurved perianth. The first of these is a large plant found growing on sand dunes, which has numerous thick flat glabrous leaves, a stout branching inflorescence with divaricate branches, rather thick racemes, and broad based bracts to the flowers. This is the plant figured and described by Jacquin (Hort. Schoenb. IV. 7. t. 414. 1804) as *A. divaricatum.*

The second is a much smaller and more slender plant that is common on fixed sandy soils. This has narrow dark green leaves usually rough with short stiff hairs and slightly channelled on the upper side, a more slender inflorescence with ascending or spreading branches, slender racemes, and small bracts. This plant has been variously named : in S. African collections it is most often labelled as *A. scabrum* or *A. elongatum.*

These two are the commonest species in the neighbourhood of Cape Town. Both have a long flowering season. It is probable that they would be among the first to be described.

Baker (J. Bot. 1872. 138 ; J. Linn. Soc. Bot. XV. 309. 1875 ; Fl. Cap. VI. 393. 1897) regarded the large plant, *A. divaricatum* Jacq., as the Linnean species and his view has been followed by most S. African botanists since. On the other hand, previous to 1872 the majority of authors did not take this view.

Linné's own diagnosis is insufficient to separate the species though his reference to Tournefort does point to the second one rather than to *A. divaricatum.* It is worthy of note that the only reference to the figure by Commelinus (Hort. Amst. I. 67. t. 34. 1647) which though not very accurate, does represent Jacquin's species, is in the appendix to the second edition of Species Plantarum (l.c. ed. 2. 1679) and is there marked with a query.

Miller (Gard. Dict. ed 7. 1759 ; ed. 8. 1768) quotes Linné's diagnosis and adds notes that seem applicable to *A. divaricatum*, though later he gave a new description that seems to refer to the other species. The majority of post-Linnean authors treat *A. revolutum* as being the smaller plant with narrow scabrid leaves. For example, Gmelin (Syst. Nat. II. 555. 1791) says : " A. foliis scabris, scapo ramoso, corollis revolutis " ; while Sprengel (Syst. Veg. II. 84. 1825) has : " A. radice fasciculata, foliis linearibus scabris scapo simpliciusculo longioribus. racemis corymbosis, petalis obtusis revolutis." Either description seems to exclude *A. divaricatum* which is, indeed, treated by Sprengel as a separate species.

Thunberg included *A. revolutum* though his diagnosis (Prod. Pl. Cap. 62. 1797) " A. foliis linearibus scapo longioribus," is not very helpful. There are specimens in his herbarium under this name but these are of more than one species (cf. Baker, Journ. Bot. 1972. 138) : some are *A. longepedunculatum* Steud. which is an entirely different plant, others represent both the species in question. The later amplified description (Thunb. Fl. Cap. ed. Schultes 318. 1823) is applicable to the smaller plant.

A. revolutum was figured in 1807 in Bot. Mag. t. 1044. The plate is of a single branch from an inflorescence and of one detached leaf. Even so it is recognisable as *A. divaricatum*, and this figure seems to have influenced Baker in regarding the two species as being the same. In his accompanying description, however, Ker Gawler says : " foliis . . . partim glanduloso-scabriusculis " which is not applicable to Jacquin's species. He also quotes *A. flexifolium* Jacq. (Ic. II. t. 412. 1793 ; Coll. Supp. 93. 1796) as a synonym of the plant figured. There is no reference to *A. divaricatum* Jacq. The figure and description of *A. flexifolium* Jacq. almost certainly refer to the smaller plant. Jacquin's plant only differs in having much more swollen and tuberous roots, and longer soft more glabrous leaves. The last feature might easily be the result of the conditions of cultivation. The roots are different ; in the figure they are as wide as long, in the common plant the roots are elongated and though slightly fleshy not more than 3—4 mm. diam. *A. flexifolium* Jacq. is not the same as the earlier *A. flexifolium* L.f. Supp. 201 1781, which is a distinct species found in Namaqualand. Jacquin's species was renamed *A. Jacquinianum* Rom. & Schult. Syst. VII. 462. 1830. Baker (J. Linn. Soc. Bot. XV. 308. 1875) regarded this as identical with *A. elongatum* Willd. Sp. Pl. II. 136. 1800.

Willdenow created that species in order to give a valid name to *A. filiforme* Thunb. Prod. Pl. Cap. 62. 1797, which is not the same as the earlier *A. filiforme* Ait. Hort. Kew. I. 451. 1789. Thunberg's description of his species is not satisfactory. In his herbarium more than one species is included under the name : of three sheets one is the smaller plant with recurved perianth. *A. elongatum* which was founded on a mixture has for long been a source of confusion. As the species is understood by Baker (Fl. Cap. VI. 389. 1897) more than one plant is without doubt included. In addition to the plant with scabrid leaves and revolute perianth there is also an eastern Cape plant with glabrous flat erect leaves, a not much branched inflorescence, and a spreading perianth (cf. Wood, Natal Pl. III. t. 208. 1902).

The plant described by Miss Duthie (l.c. II. pl. 3) as *A. elongatum* is a quite distinct one. It is allied to *A. flexifolium* L.f. but separable on the root system, straight leaves, and very broad bracts. This appears to be an unnamed species but is one that has not been found on the Peninsula.

Kunth (Enum. IV. 1843) divided *Anthericum* into a number of genera. He placed those species with pedicels articulated at the top and muricate stamens in *Trachyandra*. In this genus he maintained as distinct four species : *T. revoluta*, *T. divaricata*, *T. Jacquinii*, and T.? *elongata*. His descriptions of the last two are copied from earlier writers. As set down *T. Jacquinii* is only separable from *T.*? *elongata* on the tuberous roots that were figured by Jacquin. Both descriptions are very closely similar to that of *T. revoluta* and seem to refer to rather glabrous states of that species.

In her account of the Stellenbosch species Miss Duthie describes the smaller of the two plants under discussion under the name "*A. scabrum* L.f.? " This is an identification that is not uncommon in collections. *A. scabrum* L.f. Supp. 202. 1781 was originally described as : " A. foliis triquetris serratis, caule ramoso erecto, pedunculis fructiferis recurvis." a description which does not apply to either of the two plants. Thunberg's fuller description of the plant, based on specimens collected on the Cape Flats (Fl. Cap. ed. Schultes 320. 1823), makes it quite clear that this is a distinct species. The plant has not been collected with certainty since Thunberg's time. The plant described by Miss Duthie is certainly not the same.

From what has been said it appears that prior to 1872, the name *A. revolutum* L. was generally understood as belonging to the smaller of the two species and was very often separated from the larger one which is *A. divaricatum* Jacq. Though there has been some confusion and undoubtedly a multiplicity of species, the balance of the evidence is in favour of the smaller plant being the Linnean species. This, unfortunately, entails a change in the connotation of the names in common use.

The synonymy of the two species is as follows :—

A. revolutum L. Sp. Pl. 310. 1753.
  A. flexifolium Jacq. Ic. 2. t. 412. 1793. not L.f.
  A. Jacquinianum Rom. & Schult. Syst. VII. 462. 1830.
  A. filiforme Thunb. Prod. Pl. Cap. 62. 1797. (partly) not Ait.
  A elongatum Willd. Sp. Pl. II. 136. 1800 (partly).
  A. scabrum Duthie Ann. Univ. Stell. IV. A. 1. 15. 1926. not L.f.
  Phalangium revolutum Poir. Encyc. Meth. Bot. V. 247. 1804.
  Trachyandra revoluta Kunth. Enum. IV. 579. 1843.
  T Jacquinii Kunth. l.c. 578.
  T.? elongata Kunth l.c. 584.

A. divaricatum Jacq. Hort. Schoenbr. IV. 7. t. 414. 1804.
  A. revolutum Baker J. Bot. 1872, 138. not L.
  A. revolutum Ker Gawl. Bot. Mag. t. 1044. 1807. (excl. syn.) not L.
  Trachyandra divaricata Kunth Enum. IV. 580. 1843.

A. CANALICULATUM.

Under the name *A. canaliculatum*, Baker (J. Linn. Soc. Bot. XV. 309. 1878 ; Fl. Cap. VI. 391. 1897) described a very characteristic plant which is not uncommon on sandy soils, flowering mainly after fires, at low altitudes in the South-West Cape. The plant has horizontally spreading yellow thickened but not tuberous roots, long channelled leaves which are rough with scattered hairs, an erect hairy unbranched scape with a dense raceme, and densely hairy pedicels, bracts, and flowers. The plant here described differs from that originally described under the name by Aiton (Hort. Kew. I. 448. 1789) in a number of characters. Amongst others Aiton's plant is stated to have glabrous bracts and pedicels and there is no mention of the very obvious hairy perianth. Illustrations of Aiton's species were published in Bot. Mag. t. 1124. (1808) and Bot. Reg. t. 877. (1825). These two figures represent the same plant but certainly not the hairy flowered plant. The plant illustrated has tuberous roots, a rather lax raceme with large flowers, and thin soft hairs on the scape, pedicel, and perianth. The hairs are quite unlike the curly ones which are so conspicuous on Baker's plant. Ker Gawler (Bot. Mag. l.c.) says that specimens of the original plant which were grown at Kew had a branched inflorescence and that the plant figured differed in having hairs on the perianth. He quotes *A. hirsutum* Thunb. as a possible synonym.

On account of these differences, Lindley (Bot. Reg. l.c.) makes the plant a variety " *β rufum* " and adds the information that the filaments are smooth. Aiton in his second edition (Hort. Kew ed. 2. 268. 1811) quotes the Bot. Mag. plate as *A. canaliculatum.*

Aiton's species is one that is little known ; subsequent to its publication the original description was generally transcribed without change or comment. (e.g. Willd. Sp. Pl. II. 141. 1800 : Spreng. Syst. II. 460. 1830 (under *Bulbine*) : Kunth Enum. IV. 578. 1843 (under *Trachyandra*)).

Baker's hairy flowered plant is certainly different. It was collected by a number of the earlier collectors but was not labelled by them, e.g. Pappe, Zeyher, etc. The plant is without a name and *hirsutiflorum* is suggested. This epithet was first applied in herbaria by C. E. Moss but was not published by him.

Anthericum hirsutiflorum Adamson nom. nov. (*A. canaliculatum* Baker non Ait.).

Rhizoma breve erectum radicibus luteis subcarnosis elongato-fusiformibus. Folia plurima elongata superne canaliculata hispida pilis albis sparsis. Racemus, pedicelli floresque densissime hirsuti vel etiam lanati. Scapus simplex. Bracteae acuminatae hirsutae pedicellis paulo breviores. Fructus erectus ovatus purpureus hirsutus.

S.W. Cape. Sandy soils at low altitudes, generally among rocks. Flowering most freely after fires. Fl. Oct.—Nov.

Cape Div. Cape Flats, *Pappe* ; *Ecklon & Zeyher* 25 ; *Zeyher* 4244 ; Camp's Bay, *Pappe* ; *Zeyher* 4656, 4658 ; Wynberg, *Bolus* 3748 (type) ; *E. Kensit* ; Kenilworth, *Salter* 7734 ; Tokai, *Guthrie* 1131 ; *Wolley-Dod* 1294 ; Fish Hoek, *Levyns* ; Glencairn, *Arbuthnot* (Bolus Herb. 17474) ; Simonstown, *Compton* 5269 ; S. Peninsula, *Adamson* 2538, 2648.

Caledon Div. Villiersdorp, *de Villiers* (N.B.G. 1870/30) ; Hemel-en-Aarde, *Gillett* 49.

Paarl Div. Franschhoek Mts. *E. P. Phillips* 8549.

Piquetberg Div. Piquetberg Road, *Bolus.*

A. LONGIFOLIUM.

The plants described under the name *A. longifolium* by Baker (Fl. Cap. VI. 394. 1897) do not agree with the original description and figure of Jacquin (Ic. II. t. 413. 1793 ; Coll. Supp. 92. 1796). Jacquin's plant is one with keeled, channelled leaves with ciliate edges, a branched inflorescence, and a long dense raceme with long bracts. It does not seem to be separable from luxuriant states of *A. ciliatum* L.f. Supp. 202. 1781. On the other hand, Baker's plant is one with flat leaves usually ribbed, with harsh muricate hairs at least on the edges, an erect much branched inflorescence, and bracts very broad at the base. Exactly the same plant is described by Duthie (l.c. 9).

The plant described by Baker and by Duthie is very closely allied to *A. muricatum* L.f. Supp. 202, 1781. Of the specimens quoted by Baker (l.c.), Bolus 3809 collected on the slopes of Devil's Peak, has been examined. This plant only differs from specimens of *A. muricatum* L.f. in having narrower leaves, 5—6 mm. wide, and very few hairs on the inflorescence axis. Duthie 989 from Jonkershoek, is exactly the same. Other specimens labelled *A. longifolium*, have leaves generally hairy on the edges only but varying in width from the above to as much as 15 mm. Except for the lack of hairs it is not in any way possible to separate the wider-leaves plants from plants placed under *A. muricatum*, e.g. Ecklon & Zeyher "Lion Mountain near Green Point." The others only differ in the width of the leaf. There is no doubt that all should be placed under *A. muricatum* L.f. Jacquin's plant is quite different but is not separable from *A. ciliatum* L.f.

A. longifolium must disappear from the list of Peninsula species.

A. fimbriatum Thunb. Prod. Pl. Cap. 63. 1797 has often been looked upon as being the same as *A. longifolium* Jacq. This was first put forward with doubt by Willdenow (Sp. Pl. II. 140. 1800) and later accepted as certain by others (e.g. Spreng. Syst. II. 84. 1825 ; Baker J. Bot. 1872. 139). It is difficult now to see why this was done. Thunberg's description does not agree at all well with Jacquin's plant though it does with that placed by Baker under the name.

A. SABULOSUM.

Anthericum sabulosum Adamson sp. nov. Perennis laxe caespitosa ; rhizoma erectum ramosum radicibus fibrosis rufescentibus. Folia numerosa erecta elongata plana 25—30 cm. longa 6—8 mm. lata, in sicco saepius involuta, vaginis membranaceis albis, dorso hispida pilis brevibus rigidis sparsis, fibris foliorum antiquorum nullis. Inflorescentia foliis longior saepius lateraliter patens vel subprostrata, simplex vel ramis perpaucis 1—2, apice densissime basi sparse hispida. Racemus laxus internodiis longis. Pedicelli distichi, 15 mm. longi, internodiis aequilongi, juvenales erecti floriferi patentes fructiferi recurvati. Perianthium dorso hispidum. Loculi ovarii biovulati ovulis superpositis. Fructus sphaericus 7—8 mm. diam. pilis rigidis et squamulis parvis laciniatis densissime obtectus. Semina nigra angulata.

Sand at low altitudes, especially where just fixed. Western coastal belt from the Cape Peninsula northwards to the Doorn River.

Cape Div. Kommetje, *Wolley-Dod* 3604 (as *A. Gerrardi*) ; Raapenberg, *Bolus* ; Retreat, *Adamson* 2631 (type in Bolus Herb.), 2628, 2670 ; Koeberg, *Pillans* (Bolus Herb. 19169) ; Milnerton, *Levyns*.

Stellenbosch Div. Kuils River, *Zeyher* 4243 ; Stickland, *Acock*.

Malmesbury Div. Hoetjes Bay, *Bolus* 12868 (as *A. Gerrardi*) ; Saldanha Bay, *Bolus* 12869.

Clanwilliam Div. Lange Vallei, *Leighton* (Bolus Herb. 21618).

Van Rhynsdorp Div. Doorn River, *L. Bolus* (Bolus Herb. 20682, as *A.? scabrum*).

This is the plant that has been recorded from the Cape Peninsula (Bolus & Wolley-Dod l.c. 341) as *A. Gerrardi* Baker. It differs from that species in habit, the absence of basal fibres, unbranched inflorescences, spherical fruits, and two ovules in each chamber. In collections at least three species with densely hispid fruits have been placed under the name *A. Gerrardi*. The original *A. Gerrardi* Baker J. Bot. 1872. 137, is erect with oblong fruits with many seeds in each chamber and is a plant of eastern distribution. Baker himself later (Fl. Cap. VI. 395. 1897) extended the description to include plants with spherical fruits and few seeds.

A. sabulosum which is very distinct both in structure and in distribution, was first recognised as separate by the late Professor Moss. On herbarium sheets he applied the name "*sphaerocarpum*." This epithet was not adopted because Moss had applied it to two quite distinct plants.

A. GLABRUM.

Anthericum glabrum Adamson sp. nov. Rhizoma perbreve, erectum vel inclinatum radicibus luteis subcarnosis at non tuberosis. Folia primordia membranacea obtusa saepius rosea. Folia 3—4 rarius 6, erecta, glabra, nitida, rigida, 25—30 cm. longa, 1—1·8 cm. lata, superne canaliculata dorso rotundata. Scapus erectus, glaber, 70—90 cm. altus, subglaucus basi saepe rubro-maculatus, foliis longior, simplex vel pauciramosus ramis ascendentibus. Racemi laxi. Pedicelli 8—9 mm. longi apice articulati, erecti vel tandem patentes vel erecto-patentes. Bracteae membranaceae, pallide castaneae, acuminatae, basi dilatatae at non auriculatae, glabrae, 3—4 mm. longae. Flores 1·5 cm. longi, albi, petalis patulis dorso rubro-nervatis. Staminum filamenta muricata. Fructus glaber, 1—1·5 cm. diam., sphaericus, apice lente trisulcatus. Semina nigra, acutissime angulata.

Among rocks or under bushes on mountains at 600—2000 ft.

Cape Peninsula : Constantiaberg to Simonstown Mountains. Fl. Oct.—Nov. Steenberg, *Adamson* 2768 (type in Bolus Herb.), 2644 ; Muizenberg, *Adamson* 3072 ; Kalk Bay Mts., *Levyns* ; Fishhoek Mt. *Levyns* : *Adamson* 3031 ; Klaver Valley, *Salter* 7841 ; Rooihoogte, *Adamson* 3057.

A distinct species with the general habit of *A. hirsuta* Thunb. and often growing with that plant. Readily distinguished by the thick glabrous erect leaves, large flowers with small bracts without clasping auricles. The first formed leaves are distinctly channelled on the upper side, the later ones only slightly concave. They are rounded on the back though dried specimens may appear as if keeled.

The flowers are rather large and conspicuous for the genus and two or more in a raceme open at one time. The species flowers later than many, mid-October to mid-November.

So far the species has not been found otherwise than on the Peninsula.

SOME NOTES ON THE SPECIES OF ERIOSPERMUM WHICH OCCUR IN THE CAPE PENINSULA.

By PAYMASTER-CAPTAIN T. M. SALTER, R.N. (RET.).

A recent examination of the species of Eriospermum occurring in the Cape Peninsula brings to light the fact that there have hitherto been several misconceptions as regards their identity. Since the publication of the Flora Capensis, Vol. VI (1897) in which the late J. G. Baker made an attempt to collect together the scanty information on the subject then available in Europe, two papers have appeared which relate in part to our local species. These are (i) " The Eriospermums of the Stellenbosch Flats " by Dr. A. V. Duthie in Ann. of the Stellenbosch University, Vol. II, Sec. A, No. 3 (1924), a valuable field study of which the only criticism is the incorrect *identification* of two of the species, and (ii) " Eriospermums " by Dr. R. Marloth in South African Gardening and Country Life XIX (1929), pp. 249, 325—7, about which, as far as the local species are concerned, there is little to be said in praise These two papers are hereinafter referred to as (*Duthie*) and (*Marloth*).

Owing to the fact that all the local species are hysteranthous, i.e., the flowers and leaves appear at different seasons, the determination of specimens in this genus is not easy. They require careful and systematic collecting and it is perhaps safest to obtain the tuber, which in itself has important characters, and grow it in cultivation to ensure correlation of the leaves and flowers. The system of marking plants in the field generally proves unsatisfactory, for the marks are often removed or lost and only a small proportion of the plants produce flowers.

Two Peninsula species which have hitherto been misidentified are here described as new (*E. pumilum* and *E. cordiforme*), and a full amended description of *E. cernuum* Sond. is also given. *E. Duthieae* sp. nov., which is described here, does not occur in the Cape Peninsula, but it is included owing to its having been mistaken for *E. cernuum* (*Duthie*, p. 8). Since the species *E. latifolium* Jacq. is identical with the *Ornithogalum capense* of Linnaeus (an older name), it will be referred to under the new combination *E. capense* (p. 109).

It is not always possible to distinguish the species of Eriospermum either by the flowers or the leaves *alone*. In the key to the species which follows, an attempt has been made to combine the floral and leaf characters in such a way that the observer may arrive at a determination, and it is worth noting that the dead shrivelled leaves, particularly in the most difficult species, often persist during the flowering season and if these are carefully collected with the flower and are soaked and flattened, they will provide the necessary clue to the species. It cannot be too strongly stressed that casually collected separate leaves and flowers such as now clutter up herbaria cannot be determined and are therefore useless. As will be seen from the key, the tuber is sometimes an important factor in the determination and if possible it should be photographed or sketched.

In the early literature the term petiole is mistakenly used for the petiole-like attachment of the lamina to the tuber apex. Recent investigation by Dr. A. V. Duthie and Mr. S. Garside on seed germination and leaf morphology in this genus have shown conclusively that the so-called petiole is an extremely elongated leaf-sheath, corresponding to that in Convallaria (Lily of the Valley). It is referred to in this paper as the petiolar leaf-base.*

KEY TO THE SPECIES.

- Peduncle spirally twisted : leaf-blade slender, terete : tuber globose *spirale.*
- Peduncle not spirally twisted : leaf blade flat.
  - Scape 4—10 cm. high : leaf oblong-lanceolate, less than 1 cm. broad : tuber globose .. .. *pumilum.*
  - Scape 15—60 cm. high : leaf more than 1 cm. broad : tuber not globose.
    - Pedicels more than 1 cm. long, curving upwards, the lower much longer than the upper : inflorescence lax.
      - Leaf lanceolate, more or less erect : filaments ovate *lanceaefolium*
      - Leaf cordate, usually prostrate.
        - Leaf up to 4 cm. broad with a narrow red edge, not undulate at the margin : filaments linear .. .. *nanum.*
        - Leaf 4—12 cm. broad, not red-edged, but usually undulate at the margin : filaments ovate.
          - Leaf ciliate : tuber usually with fleshy underground runners .. .. .. *stoloniferum.*
          - Leaf not ciliate : tuber without runners .. *capense.*
    - Pedicels less than 1 cm. long, all more or less equal, the flowers in a close spike.
      - Leaf cordate : filaments ovate .. .. .. *cordiforme.*
      - Leaf oblong, lanceolate or ovate.
        - Leaf blade lanceolate, 10—20 cm. long, fleshy, often undulate at the margin : petiolar leaf-base fleshy : filaments ovate. .. *lanceaefolium.*
        - Leaf blade oblong or ovate, 4—10 cm. long : petiolar leaf-base wiry : filaments linear *cernuum.*

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*A. V. Duthie: Contribution to our Knowledge of the Genus Eriospermum Ann. Univ. Stellenbosch, 18. A2. 1940. 8.

Eriospermum pumilum Salter, sp. nov. *Planta* hysterantha nana, 4—10 cm. alta. *Tuber* depresso-globosum, 0·8—2·5 cm. latum. *Folia* apicalia, erecta, plerumque solitaria, rarius 2 vel 3 : lamina glabra, oblongo-lanceolata, 2—3 cm. longa, 5—7 mm. lata, parte petiolacea exserta superne plerumque pubescente. *Pedunculus* gracilis, rigidus, (parte subterranea inclusa) 7—15 cm. longa. *Racemus* anguste conicus, 2—4 cm. longus, 6—20-florus : pedicelli inferiores 4—15 mm. longi, superiores gradatim breviores. *Perianthium* campanulatum, 4—5 mm. longum, segmentis omnibus subpatentibus. *Filamenta* linearia.

Hab. Cape Peninsula ; Kenilworth Racecourse, on a granite outcrop, *Salter* 8838 (*type* in Bolus Herbarium), *Schlechter* 456, *Bolus* 7123 ; De Klip, in a similar situation, *Salter* 8364 ; near Wynberg, *Schlechter* 1387 ; Claremont Flats, *Guthrie* 787 ; Stellenbosch Div., on flats near Stellenbosch, *Duthie* 546, Herb. Univ. Stell. 1360, 1370, *Salter* 8373.

Hysteranthous, dwarf, 4—10 cm. high. *Tuber* often 3—5 cm. deep, depressed globose, 0·8—2·5 cm. in diam., with white flesh, the roots emerging on the upper half : growing point solitary or rarely 2—3, apical. *Leaves* erect, appearing in May : lamina oblong-lanceolate, glabrous, usually 2—3 cm. long, 5—7 mm. broad, the exserted part of the petiolar leaf-base as long as or shorter than the lamina, usually pubescent. *Peduncle* slender, rather wiry, glabrous, including the subterranean part 7—15 cm. long, with one short sheathing bract. *Raceme* glabrous, appearing Mch.—Apl., 2—4 cm. long, narrowly conical, usually 6—20-flowered : pedicels erecto-patent, the lowest 4—15 mm. long, the upper gradually shorter : bracts basal, broadly ovate, acute, semiamplexicaul, about 1 mm. long. *Perianth* campanulate, the segments almost free, 4—5 mm. long, with a greenish-brown keel, the margins submembranous, the outer oblong, subobtuse, the inner narrow-obovate, acute, spreading. *Filaments* linear, 2·2 mm. long : anthers ovoid, about 1 mm. long. *Ovary* ovoid, smooth, 1·3 mm. long : style slender, as long as the ovary. *Capsule* turbinate, 3—4 mm. long : seeds coated with white wool.

This small species was first cited by Baker (*Schlechter* 456) under *E. cernuum* the plant referred to being from the same locality as *Salter* 8838. This specimen was either overlooked or accepted as *E. cernuum* by Dr. Marloth. Dr. A. V. Duthie identified plants of this species as *E. parvifolium* Jacq., describing them under that name (*Duthie*, p. 9 and Pl. 4), but later, on the discovery of the true *E. parvifolium* in Namaqualand by the late Dr. Marloth, acknowledged that they had been wrongly identified. *E. pumilum* is evidently a close affinity of that species, but differs in the very much smaller size of all its parts, narrower leaves, the compact and shorter inflorescence and in the smooth unridged broader ovary.*

In the Cape Peninsula it occurs in crevices or shallow soil overlying granite outcrops on the Flats and though confined to small areas, it is abundant and gregarious in habit. It is also very common on the Stellenbosch Flats.

Eriospermum cordiforme Salter, sp. nov. *Planta* hysterantha, 15—50 cm. alta. *Tuber* informe, 3—8 cm. in diam., tuberculata, vetusta majora, ramosa. *Folia* plerumque basalia vel lateralia: lamina prostrata, cordata, in umbrosis protracta, 5—16 cm. longa, 4—13 cm. lata, inferius parte petiolacea vix exserta, saepe hirsuta. *Pedunculus* erectus (parte subterranea inclusa) 20—55 cm. longus. *Racemus* densus, spiciformis, saepe secundus, 3—12 cm. longus, 10—28-florus, pedicellis subaequalibus, brevibus. *Perianthium* urceolato-campanulatum, fere 5.5 mm. longum: segmenta basi breve connata, exteriora subpatentia, interiora erecta, apice coarctata. *Filamenta* basi connata, parte libera ovato-deltoidea, fere 2 mm. longa.

Hab. Cape Province: Cape Peninsula, near Milnerton, *Salter* 8351 (*type* in Bolus Herbarium); Devil's Peak, *Salter* 8315, *Marloth* 8490; Camps Bay, *Marloth* 4367, 7573, 8330. Caledon Div., Kleinmond, *Marloth* 13608; Swellendam, *Marloth* 12947; Riversdale, *Andreae* 1139.

Hysteranthous 15—50 cm. high. *Tuber* usually 5—12 cm. deep, irregular in shape, the older with reddish flesh, commonly 3—8 cm. in diam. or larger, branching and compound in old plants, the old growth hardish, brown, the new pale, the numerous root-bases tuberculate. Growing point solitary or several in old plants, the new growth usually ascending in a distinct groove on the lateral or basal surface of the tuber. *Leaves* solitary or produced on each lobe, appearing in June, more or less prostrate, broadly cordate, but lengthening in shade, 5—16 cm. long, 4—13 cm. broad, slightly transversely wrinkled, undulate at the margin on the lower half, the petiolar leaf-base sometimes hirsute, scarcely exserted above ground except when the leaf is drawn up by surrounding vegetation. *Peduncle* erect, 20—55 cm. long, appearing Feb.—Mch. *Raceme* dense, spicate, secund, 3—12 cm. long, 10—28-flowered, the pedicels subequal, 2—7 mm. long: bracts small, semi-amplexicaul, broadly ovate, acute or attenuate. *Perianth* about 5·5 mm.

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* The following specimens in Dr. Marloth's herbarium, named *E. apicale* Marloth (unpublished), have been identified by Dr. Duthie and Mr. Garside as the true *E. parvifolium* Jacq. Namaqualand: Steinkopf District, mountains near Klipfontein Station, *Marloth* 12477, *G. Meyer* (Marloth 12943 b), 23 miles S.W. of Steinkopf, among shrubs, *Marloth* 13250; O'Okiep, *Marloth* 12493; Kamieskroon, *Peers* (Marloth 13694).

long, urceolate-campanulate, the segments connate at the base for about $\frac{1}{4}$ of their length, dull white, brown-keeled and suffused with minute red streaks below, the outer elliptic, acute, somewhat spreading, the inner erect, obovate, slightly pinched in at the apex. *Stamens* about half as long as the perianth, connate at the base, the free part ovate-deltoid. *Ovary* broadly ovoid, as long as the style. *Capsule* turbinate or pyriform, about 6 mm. long. *Seeds* ovoid, 2 mm. long, coated with white hairs.

The leaves of the type specimens from Milnerton are entirely glabrous, but those from Table Mt. and Devil's Peak are more or less hirsute on the petiolar leaf-base.

This is the species which the late Dr. Marloth unaccountably mistook for *E. Bellendenii* Sweet, which was described from a plant "from South Africa" grown in England and figured in Bot. Mag. tab. 1382, but it scarcely corresponds with the description of that plant in any particular except the shape of the leaf and the spicate arrangement of the flowers. Its thinner leaf, smaller and slightly gamopetalous perianth segments and differently shaped filaments (ovate-deltoid, connate at the base and not lanceolate, almost free), separate it from such plants as *Zeyher* 739, Uitenhage and *MacOwan*, Somerset East, cited by Baker as *E. Bellendenii*, whether or not he was correct in associating these specimens with the illustration referred to above.

Eriospermum Duthieae Salter, sp. nov. *Planta* hysterantha gracilis, omnino glabra, 5—30 cm. alta. *Tuber* cylindricum vel pyriforme, 1—4 cm. longum, rarius lobatum. *Folia* lateralia vel basalia, erecta, plerumque solitaria: lamina oblonga vel elliptica vel anguste ovata vel lanceolata, 2—4 cm. longa, 0·6—1·6 cm. lata, parte petiolacea exserta. *Pedunculus* gracilis (parte subterranea inclusa) 8—35 cm. longus, basin versus leviter flexuosus. *Racemus* 2—5·5 cm. longus, 2—18-florus, subcernuus, saepe secundus: pedicelli inferiores ad 1·4 cm. longi, superiores gradatim breviores. *Perianthii* segmenta patentissima, 5—5·5 mm. longa. *Filamenta* lineari-lanceolata, attenuata.

Hab. Cape Province: on flats near Stellenbosch, *Duthie* (Herb. Univ. Stell. 1362, *type* in Bolus Herbarium), 1083, 1373, 1361, *Salter* 8375; near Mulders Vley, *Salter* 8387: Somerset West, on flats, *Garside* 4985.

Hysteranthous, entirely glabrous, 5—30 cm. high. *Tuber* cylindrical or pyriform with white flesh, 1—4 cm. long, simple or more rarely lobed, the longer axis horizontal, inclined or vertical, 3—5 cm. deep in the soil, the growing point at the broader end. *Leaves* erect, usually solitary, or produced on each lobe; appearing July: blade oblong, elliptical, narrow-ovate or lanceolate, acute or subobtuse, 2—4 cm. long, 0·6—1·6 cm. broad, slightly involute at the base, the petiolar leaf-base 6—10 cm. long, the exserted part as long as or longer than the blade. *Peduncle* very slender, wiry, including the subterranean part usually 8—35 cm. long, often slightly flexuous towards the base, with one small sheathing bract. *Inflorescence* appearing Mch.—May: raceme 2—5·5 cm. long, 2—18-flowered, often secund and subcernuous: lower pedicels up to 1·4 cm. long, the upper gradually shorter: bracts basal, minute. *Perianth* open and wide-spread, the segments 5—5·5 mm. long, white, minutely red-streaked towards the greenish keel: the outer oval, the inner broadly cuneate-obovate, subacute, very minutely toothed on the upper margins. *Stamens* about half as long as the perianth segments: filaments linear-lanceolate, attenuate. *Ovary* subglobose, as long as the style. *Capsule* about 4 mm. long: seeds small, 1·5—2 mm. long, coated with white hairs.

This plant was first identified as the ill-described *E. cernuum* Baker and described as such by Dr. Duthie (*Duthie*, p. 8 and Plates 2 and 3). As will be seen from the amended description of *E. cernuum* which follows, it differs in many important characters. Furthermore, unlike *E. cernuum*, it is gregarious in habit. It does not, as far as is known, occur in the Cape Peninsula.

For further particulars of this species see *Duthie*, p. 9, pars. 1—4.

ERIOSPERMUM CERNUUM Baker. This species was first named by Baker in Flora Capensis, VI., 370, where he gives a short and entirely inadequate composite description of two different species (here a character from one and there a character from the other). In neither species are the fresh flowers cernuous as described.

Three collectings are cited. *Bolus* 7238 (Hout Bay) and *Schlechter* 427, flowers only (near Retreat Station) are one species and *Schlechter* 456 (Kenilworth Racecourse) is another. The latter species which has also been found at Stellenbosch, is here given the name *E. pumilum* sp. nov.

It is proposed to choose the first-cited specimen, *Bolus* 7238, as the *lectotype* of *E. cernuum* Baker and the following is a new and amended description of this species.

Eriospermum cernuum Baker, emend. Salter. Hysteranthous, entirely glabrous, 20—40 cm. high. *Tuber* more or less oval or pyriform, smooth, often 15 cm. deep, up to 4 cm. long, with pale flesh, the growing point at the broader end. *Leaf* usually solitary, erect, dark green, appearing in June, the exserted part of the petiolar leaf-base rigid about as long or longer than the lamina: lamina oblong or ovate, acute or subobtuse, usually 4—10 cm. long, 1—2 cm. broad. *Peduncle* slender, erect, including the subterranean part 30—60 cm. long. *Raceme*, appearing Feb.—Mch., erect closely spicate, 8—18-flowered : pedicels subequal, the lowest up to 2·5 mm. long. *Perianth* urceolate-campanulate, the segments entire with whitish margins, minutely red-streaked towards the rather narrow greenish keel, the outer somewhat spreading, narrow-obovate, subacute, about 5 mm. long, the inner cuneate, acute, slightly pinched in and white-winged at the apex, about 6 mm. long, rather wider than the outer. *Filaments* linear, tapering slightly towards the apex, more than half as long as the perianth segments. *Ovary* broadly ovoid, smooth, about as long as the style. *Capsule* slightly longer than the perianth. Seeds coated with white wool.

Hab. Cape Peninsula ; hill sides and sand dunes neat Hout Bay, *Bolus* 7238 (*lectotype* in Bolus Herbarium) ; near Retreat, *Schlechter* 427 (without leaves) ; Kenilworth Racecourse, *Bolus* 7937 ; Cape Flats, *Zey.* 4278 ; Claremont Flats, *W.-Dod* 926, *L. Bolus* ; Young's Field, *Salter* 8366 ; Steenberg Plateau, *Salter* 8348 ; near Smitswinkel, *Levyns* 6548, *Salter* 8318, 8370 ; Red Hill, 8362 ; Klaver Valley 370/3 ; Sirkels Vley, 3044b : Somerset West, on flats, *Garside* 5006.

This species occurs on heathy flats and hill plateaus, growing up through low vegetation, often among Restionaceae, but it is not very common, the plants usually being isolated and widely separated. It has unfortunately been confused with yet a third and very different smaller and highly gregarious species (*E. Duthieae* Salter) which has a lax and somewhat cernuous inflorescence, occurring on the Stellenbosch Flats, and it is to this plant that Dr. Duthie's description of *E. cernuum* Baker (*Duthie*, p. 8) refers.

Eriospermum capense (L.) Salter, comb. nov. (*Ornithogalum capense* L.—*E. latifolium* Jacq.). *Ornithogalum capense* was founded by Linnaeus (Sp. Plant. I, 1753) on two old pre-Linnaean drawings :—

Breyn, Centuria prima t. 41.
Commelin, Hort. Amstel. ii, t. 88.

but there is no specimen authenticated by Linnaeus in his herbarium.

Breyn's figure is not well drawn, but there is little doubt that that of Commelin represents the species later so excellently figured by Jacquin as *E. latifolium* (Icones ii, 18, t. 420), the name by which it is known in the Flora Capensis. The leaves in Commelin's figure appear to be slightly etiolated, as might be expected in a plant cultivated in Europe, and they resemble those of wild specimens which grow in partial shade.

E. capense grows abundantly on the western slopes of Lion's Head above Fresnaye and it is also recorded from Orange Kloof. It has large cordate glabrous leaves and a lax inflorescence with upcurving pedicels up to 4·5 cm. long. The late Dr. Marloth makes a categorical statement that *E. capense* (*E. latifolium* Jacq.) does not occur in the Cape Peninsula (*Marloth*, p. 249). Even granted that he himself was not fortunate enough to observe it, he seems to have overlooked several unmistakeable specimens in the Bolus Herbarium. If, as seems probable, he saw *only the leaves* of this species, he apparently concluded that apart from the species which he named *E. stoloniferum* Marloth, there was only one other with large cordate leaves, i.e. the species which he erroneously attributed to *E. Bellendenii* Sweet and which is here described as *E. cordiforme* sp. nov.

The leaves of both species are similar in shape, but those of *E. capense* are not always longitudinally plicate as shown in his photograph (*Marloth*, Fig. 1). It is doubtful whether the leaves alone are distinctive, particularly when dried, and the leaves collected by Thunberg, to which Dr. Marloth refers, do not seem to be of any importance, for they may have belonged to either species.

Above Fresnaye *O. capense* usually grows in the open, but also, less abundantly, in partial shade and it appears to hybridise* with *E. lanceaefolium* Jacq., which in that locality occurs mostly in shady situations, even in the dense shade of pine woods. In shade, as is the case with all species with cordate leaves, the lamina in *E. capense* tends to lengthen and the petiole to become exserted, and such leaves resemble those of some of the suspected hybrids. Further in *E. lanceaefolium*, even in apparently pure colonies as judged from the leaves, two distinct kinds of inflorescence occur, one a close spike with subsessile flowers and the other a lax raceme with longer upcurving pedicels, very similar to that of *E. capense* : intermediate states are also not uncommon. Inflorescences which appear to be intermediate between the two species, must therefore be treated with suspicion. In the dense shade of a pine wood near Fresnaye *E. lanceaefolium* was plentiful and although only the spicate form of inflorescence was found, many of the leaves collected later were abnormally broad for *E. lanceaefolium*, suggesting that such plants were the result of past hybridisation and that only hybrids near to *E. lanceaefolium* had been able to survive in such dense shade. (Fig. 1.)

A series of leaves all collected in an area about 6 ft. square in partial shade, just below the wood, show a complete range between the two species, and the one dead inflorescence found, that belonging to the leaf A, was intermediate. (Fig 2.)

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* My suspicions of hybridisation between these two species were originally aroused by Mr. S. Garside, who discovered a colony showing a high degree of polymorphism, almost certainly due to hybridisation, when we were collecting near Wemmershoek in 1934. Specimens from this colony have been cultivated over a period of years by Dr. A. V. Duthie, and it is hoped that a detailed description of these will be published at an early date.

Among bushes below the wood, where typical plants of both species occur, there were intermediate leaves, many of which were too narrow to suggest etiolated forms of *E. capense.* (Fig. 3.)

On the open slopes which had been burnt off two years ago, *E. capense* was growing in the greatest abundance. Here only one plant of *E. lanceaefolium* was observed and a few intermediate leaves were found which suggested hybrid origin. (Fig. 4.) The tuber of a plant with an intermediate inflorescence, collected in this area, produced in cultivation a leaf proportionately wider than that of *E. lanceaefolium.*

E. LANCEAEFOLIUM Jacq. (Icones ii, t. 421). This species is fairly common and seems to flourish equally well both in open places and in shade, being one of the few plants that has been able to survive in the pine woods which have ousted so much of the indigenous vegetation.

The two kinds of inflorescence have already been mentioned. The short-pedicelled form is by far the commoner in the Cape Peninsula and this form alone seems to occur in shady situations. In colonies which occur on open ground a few plants with the lax inflorescence and long pedicels, together with intermediates, will generally be found. Such colonies occur in the shallow soil overlying the granite outcrops at De Klip and on Kenilworth Racecourse where, since *E. capense* has never been observed, there is no suspicion of hybridisation to account for the two types of inflorescence.

It is remarkable that no specimens of this species should have been seen by Baker. *Bolus* 6610 from Little Namaqualand, the only specimen which he cites, seems to be closely akin to *E. parvifolium* Jacq. and is certainly not *E. lanceaefolium.* On the other hand probably none of the plants which he cites as *E. parvifolium* actually belong to that species. Judging from a tracing in the Bolus Herbarium, *Burchell* 8343, from between Stellenbosch and Bottelary Hill, appears to be *E. graminifolium* Duthie. (*Duthie,* p. 10.)

E. STOLONIFERUM Marloth. (*Marloth,* p. 249.) This species is very local and is only known to occur on damp ledges within the cloud area on the north-east face of Lion's Head, just above the pine woods. The production of fleshy underground runners is not peculiar to this species, but this character, together with the constantly ciliate leaves, does distinguish it from *E. capense.* The inflorescences are identical and it is perhaps little more than a local variety.

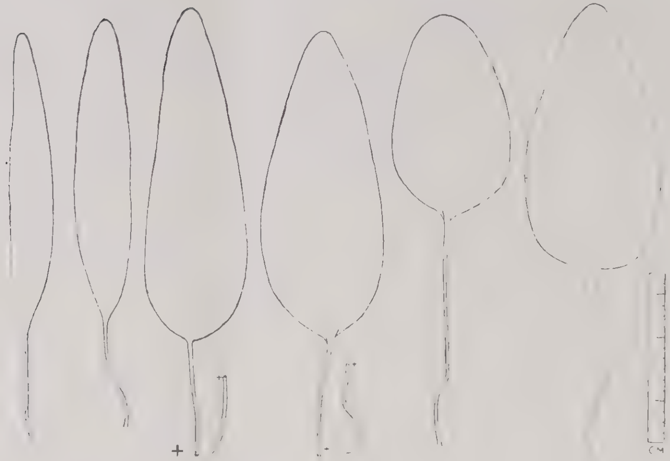

FIG. 1. Leaves of Eriospermum from dense shade in a pine wood. The two narrow leaves are typical of *E. lanceaefolium*, the remainder suggest hybridisation with *E. capense*. All × ⅓.

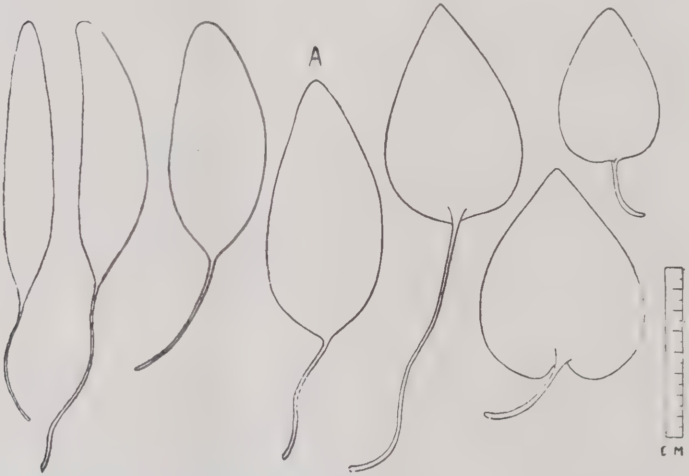

FIG. 2. Leaves of *Eriospermum lanceaefolium*, *E. capense* and supposed hybrids from a colony in partial shade. The plant with the leaf " A " had a withered inflorescence which was intermediate between the two species. All × ⅓.

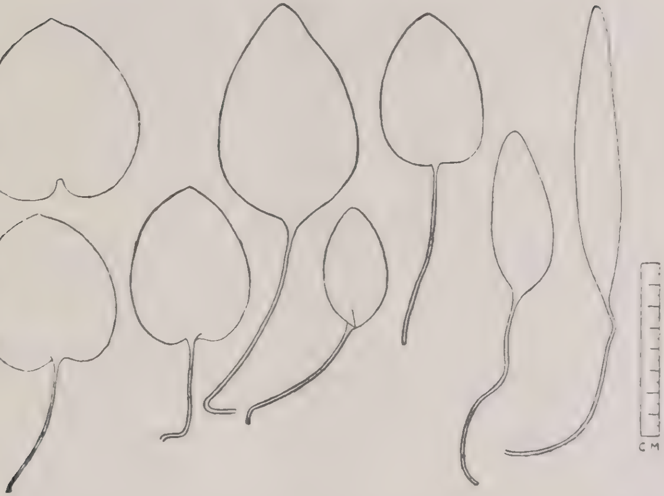

FIG. 3. Leaves of *Eriospermum capense* and *E. lanceaefolium* from bushy ground, together with intermediates suggesting hybridisation. All × ⅓.

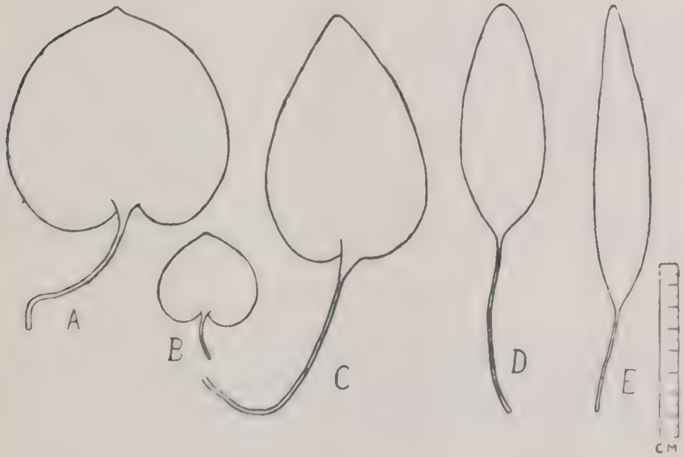

FIG. 4. Leaves of Eriospermum from open hills slopes. A and B. Typical *E. capense*. C. A shade form of the same. D. A supposed hybrid. E. Typical *E. lanceaefolium*. All × ⅓.

E. NANUM Marloth. (*Marloth*, p. 325.) is perhaps the commonest and most widely distributed of the local species and also the most variable in size. The small hill-side form only seems to have been known to Dr. Marloth, but his description of the species is inaccurate and does not even agree with the specimens in his own herbarium. In many of these the scape is longer than 4—6 inches, the pedicels are often 1 inch (not 3—6 lines) long and the perianth constantly 2½—3 lines (not 4 lines) long.

Plants which undoubtedly belong to the same species occur in semi-open places in pine woods at Bergvliet and Tokai in which the scapes are up to nearly 2 ft. high, up to 29-flowered and with pedicels over 1½ inches long. The name *nanum* (dwarf) is therefore hardly appropriate.

E. SPIRALE (L.) Berg. has not been observed locally for some years· One former habitat, an outcrop of granite on Kenilworth Racecourse has been almost entirely demolished through quarrying and it can no longer be found there. The only other recorded locality, given vaguely as Claremont Flats (1892) may now have been built over, but the plant is very small and inconspicuous and it may possibly still occur. It flowers in April and May and has very small white flowers, but the leaf, which appears in July, is minute and very difficult to find. It is locally common on the Stellenbosch Flats (*Duthie*, p. 11).

E. PUBESCENS Jacq. has been listed as a Peninsula species and though it becomes common in the Malmesbury and Stellenbosch Divisions, there appears to be no authentic record of its occurrence nearer than the flats east of Blaauwberg, about 16 miles away. Baker in Flor. Cap., cites *Bolus* 3916 from the "Cape Flats," but the specimens are without leaves and therefore impossible to identify. The locality "near summit of Lion's Head" given for this species in the "List of Flowering Plants in the Cape Peninsula" by Dr. H. Bolus and Major Wolley-Dod in Transactions of S.A. Phil. Soc. Vol. XIV. p. 340, suggests that the plant from this locality was the one later described as *E. stoloniferum* Marloth.

ACKNOWLEDGMENT.

I am very much indebted to Mr. S. Garside for his help and advice in the preparation of this paper and also to the Curator of the Stellenbosch University Herbarium for the loan of certain specimens.

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WILLIAM JOHN BURCHELL, BOTANIST.

By Helen M. McKay.

Part III. : Burchell in England and Brazil.

Ten Years in England.

Burchell sailed from Cape Town, with his forty-eight packages, on board a small trading vessel, *Kate*, on 25th August, 1815, and arrived at St. Helena on 13th September.

All his journals giving information about his activities after 2nd September, 1812, are still missing ; so it is well to bear in mind that statements made in this article are founded on facts gathered from his letters, his drawings and the manuscripts dealing with his collections.

He visited some of his old haunts in St. Helena, and he remarks on the prosperity of the *Chenopodium ambrosioides* he had planted.* During his short stay of four days he made some beautiful sketches, but none of them are of botanical interest.

His arrival at Fulham on 11th November, 1815, caused a flutter in the heart of William Swainson(38) who, though unacquainted with Burchell at the time, became, about four years later, one of his greatest friends. Letters written to Swainson by Burchell are preserved in the collection of manuscript letters in the Library of the Linnean Society of London, and, from them, much can be learned about the great naturalist.

Swainson in his autobiography, which he published in 1840, in the volume *Taxidermy* (Cabinet cyclopaedia series), says :—

> " Happening to spend an evening with Mr. Lambert(5), the celebrated botanist, he told me he had just had a letter from a friend of his, who had been many years at the Cape, and had brought with him a collection which filled two waggons ! This friend was no other than Mr. Burchell. I heard the news with dismay : for what, thought I, can be now left in South Africa more than the gleanings of a harvest already reaped ? A little consideration

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* *The Journal of S. Afr. Botany.* Vol. VII, Part 1, p. 4. Jan., 1941.

> might have showed me the absurdity of this opinion: but as I could not submit to follow in the wake of another, I at once determined to relinquish the Cape, and choose some other quarter yet untrod by the naturalist."

Swainson went to Brazil in 1816, but because of war in that country, was unable to journey into the interior. That was left for Burchell to do.

For about four years after his return from South Africa, Burchell was much occupied with horticulture. The large nursery had been leased, in 1813, by Matthew Burchell to Messrs. Whiteley & Co.; but he still retained gardens and greenhouses in the immediate vicinity of Churchfield House, the family residence. Here, and in Messrs. Whiteley's nursery, Burchell busied himself in 1816 with the sowing of South African seeds and bulbs he had collected.

A record of his work in this connection is preserved in the *Hortus Fulhamensis* MS. now in the Library of the Herbarium at Kew. In this volume there are over two thousand entries: in it the locality where the seeds or bulbs were gathered, the dates when they were collected when sowed, came up, and in several cases, died, are duly given.

In 1815 Messrs. Ridgways, London, published *The Botanical Register*, which was edited by J. Bellenden-Ker(39) and which had been started in opposition to the *Botanical Magazine*. Burchell was introduced to the public in Volume II of this series, 1816, in connection with *Amaryllis coranica*, t. 139. The text reads:—

> "Besides being new and ornamental, the present species has a claim to our interest as the first-fruit offered to the public from the long and arduous expedition of Mr. W. J. Burchell. The following are the memoranda with which he has obliged us concerning the subject of this article. 'I discovered this beautiful plant in the Corana country, in the interior of Africa, several days' journey beyond the Orange River, in the latitude of 28 degrees south. [C.G. 2532. 20.12.1812, on the way south, between Kuruman and Kosi Fountain—Kuruman District.] It grew in a grassy plain of sand, in such profusion as to remind me of a vast bed of choice flowers. The air was perfumed by an odour from the blossoms resembling that of the Tuberose. It begins to open its flowers in succession about sunset, and continues in beauty for about a week or fortnight. The bulbs as they stood when I found them were nearly nine inches in diameter, of a spherical form enveloped in a coat found by innumerable integuments, the outermost of which were grown together into a hard brittle mass, forming the exterior bark. From an estimate of the number of the integuments, I should judge the larger bulbs the growth of not less than 200 years, pro-

> bably 300. When divested of the external exuviae, the live part does not exceed 4½ inches in diameter. Notwithstanding, those I have brought home have been three years and three months out of ground, they are now growing in my garden in as flourishing a state as on their native spot, and have flowered in perfection. In their own climate the bloom is produced in December, and it is not unworthy of remark how readily they have yielded to the reversal of the seasons in this part of the globe by flowering in June.'
>
> "The drawing by S. Edwards(40) was taken from a plant in Mr. Burchell's garden at Fulham."

There is no mention of this Amaryllis in the *Travels*, so it can be assumed that Burchell was reserving descriptions such as this for purely botanical publications.

Between 1816-19 about twenty new bulbs were introduced to horticulture by Burchell through the medium of the *Botanical Register*, and among them was *Hypoxis obtusa*, " Mr. Burchell's Hypoxis ".

The plant was described (Vol. II, t. 159, 1816) by Ker(39) and a drawing made by Sydenham Edwards(40).

In Burchell's unpublished journal,* under the date of 28th August, 1812, when he was on the plain south of Litakun [Kuruman], is the following :—

> " I collected on the road 4 immense bulbs of *Haemanthus toxicarius* and 4 of *Hypoxis obtusa*."

Of the *Hypoxis* (C.G. 2247/2, Bulb 27), he says in his *Ephemeris*, p. 59 :—

> " This differs from all the Cape species in the obtuseness of the petals : in its flowers opening and continuing open in every state of the weather and in the golden color of the flowers. In the other species the flowers are never found to be open but in warm sunny weather."

This interesting note does not appear in the *Botanical Register*. For a reproduction of Burchell's own drawing of this *Hypoxis*, see Plate IX.

Because of his collection of bulbs, Burchell came in direct contact with such patrons of horticulture as Prince Leopold of Saxe-Coburg to whom he gave a hundred plants ; with Lord Carnarvon who had large gardens and conservatories in Hampshire and whose relative, the Hon. William Herbert(41), paid frequent visits to Burchell while preparing his various papers on bulbous plants, particularly Amaryllis.

Burchell's sister Mary, when writing in June, 1817, to another member of the family, says : " Lord and Lady Caledon called to see William ".

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* In the Library of the Hope Dept. of Zoology (Entomology) Univers. Mus. Oxford.

No doubt they enjoyed renewing acquaintance with Cape blooms, for by that time several bulbs were flowering.

Another welcome visitor was Rev. C. I. Latrobe, the Secretary in London for the United Brethren's Missions to the Heathen. He had been in South Africa in 1815-16, and brought news of Hesse, Villet, Polemann and other Cape Town friends. Burchell supplied Latrobe with the scientific names for the list of trees, shrubs and plants in the work he published in 1818, entitled *The Journal of a Visit to South Africa.*

This contact must have acted as a stimulus to Burchell, for, by the middle of 1818, he was working seriously with the material in his herbarium, dispersing some of its contents among experts and making a choice of botanical matter for inclusion in his *Travels.*

He consulted Sir James Smith(42) about his *Croton gratissimum** ; he was in touch with R. A. Salisbury(7) about his *Erica ;* with Haworth(36) about his succulents. To Dawson Turner(30) he had handed over all his *Fuci.* In Volume IV of Turner's work on Fuci, which was published in 1819, tribute was paid to Burchell in the following words :—

> " *Fucus cornutus.* I have lately received it in a more perfect state from my friend Mr. Burchell. For my part I can only lament that he did not return sooner ; this work might otherwise have received material assistance from his kindness."

Burchell met A. P. de Candolle, the great Genevese botanist, when he came to London in 1816 to consult the Banksian and Lambertian herbaria, and correspondence was carried on between them for several years. The young naturalist notes in his *Memoranda Botanica* MS. II, that several of his plants were to be mentioned in the second volume of De Candolle's *Systema Naturale.*

Writing to W. J. Hooker in March, 1819, Burchell says :—

> " If you happen to have my last letter still by you, you will find there an exposition of my views and it will be unnecessary to repeat how desirable I think it, that my mosses should be given to the world by so able a pen and pencil as yours. With this view I have the pleasure of sending you a copy of my memoranda respecting the numbers you have prepared for publication.
>
> " I should mention that it was my practice when on my travels to give such specific names to my plants as the view of them in their native place of growth naturally suggested without attending to their being new or not, which I had not always on the spot, time to ascertain : but my object in thus naming them was that on my return to England, I should furnish all the new species with more

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* *Travels,* Vol. II, p. 263.

appropriate names than an inspection of the dried specimens in the herbarium might probably suggest to me. When several names offered themselves to my mind equally eligible, I made a memorandum of them all."

This letter throws light on Burchell's ideas on classification and supplements the remarks made on the subject in the *Travels.*

By 1819 Burchell was known to the leading botanists and horticulturists in Britain, but he never became in any way associated with the Horticultural Society, though he was on friendly terms with its officials. Several important botanists in European countries had heard of his collection, and in 1820 Robert Brown(43) perpetuated his name and his work in South Africa by designating a genus of Rubiaceae, *Burchellia capensis.*

From 1819-1823 Burchell busied himself with literary work. After his appearance before the Committee of the House of Commons, reporting on the poor laws, and the publication of his *Hints on Emigration to the Cape of Good Hope* in 1819, he retired to a quiet spot near Sevenoaks, Kent, and began writing his *Travels.* What a pity it was that his literary work stopped where it did! When handling his letters and manuscripts, it can be appreciated how the zeal for watching and recording the growth of his South African treasures, the searching for a niche for them in the ever growing botanical nomenclature, and the thrill to be got when comparing some of his specimens with those actually gathered by Thunberg (for Agardh(44) had lent him some), all helped the dreamer to dream, but not to realise what a great work was being left unfinished.

For Plate X there has been chosen his drawing of one of the species of the still very imperfectly known genus, Massonia, his *M. candida* (*M. longifolia var. candida*, Fl. Cap. VI, p. 415). He gathered Bulb 109, C.G. 6197/5 on 10.10.1814 "at our station on the Eastern Bank of the Little Brakke River" (Mossel Bay). In his notes he tells us "the flowers smell like a Gansels Bargamot Pear". Burchell's drawing was made in 1817, but it was not until 1823 that a description of the plant appeared in the *Botanical Register*, t. 694. The drawing accompanying the text was made by M. Hart from a plant that had been raised two years before (1821) from seed obtained from Burchell.

By the time he had finished the writing of the second volume of *Travels*, Burchell was ready to go a-wandering once more, and as his friend, Dr. Hooker, had, in the meantime, settled as Professor of Botany in the University of Glasgow, he set off for Scotland in June, 1824.

From his *Memoranda Botanica* MS. II come just a few hints as to what took place there. He collected between Ben Lawers and Loch

Lomond, around Lanark and Edinburgh and in the Clova Mountain, and, later on, exchanged specimens, living plants and seeds with the Botanic Gardens both in Glasgow and Edinburgh.

A friendship sprang up between him and Robert K. Greville(35), and though a few of Greville's letters to Burchell have been noted, full research into the correspondence has been interrupted owing to the present world war. Here is, however, an interesting extract from a letter written by Greville from Edinburgh on 9th November, 1824, to Winch(45)* :—

> "Our first excursion to the Highlands (that of Dr. Hooker's class) was very productive. He was joined by Mr. Burchell, Mr. Arnott(46), Dr. Townsend and myself. . . . How strikingly a little knowledge and a botanical eye is shown in this excursion. Hooker's pupils were above twenty in number, yet all the good things were found by the few scientific gentlemen who joined his party (always excepting Mr. Earle's share of *Arenaria rubella*). In our second excursion we had only Hooker, Burchell and myself with Drummond of Forfar as a sort of botanical guide. We found nothing positively new ; but to make up for it, several of the very rarest British plants."

On his way south Burchell visited the Lake District and Liverpool where Swainson entertained him. Brazil was now the chief topic of conversation, for Swainson, who had returned from Rio de Janeiro in 1819, rekindled the desire, which was started while Burchell was contacting captains from "the Brazils" at St. Helena, to see for himself the beauties of that wonderful country.

He became restless and immediately set about searching for information as to how he could get into this foreign land.

BRAZIL.

At the close of the Napoleonic wars, the King of Portugal, who had been exiled in Brazil, returned to Lisbon and left his son, Pedro, as Regent at Rio de Janeiro. Before a year had passed the Brazilian States drew up a constitution and installed Pedro as Emperor. King John, jealous of his son's new power, asked Britain to intervene. Canning, then Britain's Foreign Secretary, realised that it was advisable, because of British trade with Brazil, to help to bring about a reconciliation between the old kingdom and the new empire, and so in March, 1825, to carry on negotiations for this, he sent a special mission under the leadership of Sir Charles Stuart to Rio de Janeiro.

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* The Linnean Society of London. Letters MSS.

Burchell managed to obtain permission to sail with this mission. He had to make hurried preparations. He consulted Swainson about his equipment and gathered all the information he could about the visits of other botanists to South America.

He sailed on board the *Wellesley* from Portsmouth on 15th March, 1825, and landed at Lisbon on 25th March. Here he remained till 25th May. He botanised, sketched and took "regular lessons of a Portuguese Master for the Portuguese language, to get a right pronunciation". [So he wrote to his Father].

Only one day was spent at Funchal and two days at Santa Cruz, Teneriffe: but even in that short time he collected and sketched. His notes relating to the herbaria of Portugal, Madeira, Teneriffe, are to be found in his *Memoranda Botanica* MS. I, Part II. Some sheets of specimens, all in a good state of preservation, of the Madeira and Teneriffe collections are in the School of Botany herbarium at Oxford, but the bulk of the material gathered is in the Kew herbarium.

He left Teneriffe on 3rd June and landed at Rio de Janeiro on 18th July.

In a letter* to R. A. Salisbury, dated 14th August, 1825, he says:—

> "In forming my ideas, in England, of what it might be to accompany an embassy, I certainly have been very much mistaken; but at any rate, I am now in South America and have at least the gratification of finding Nature under all her shapes, always interesting. As to the Botanical riches of this country (at least what little I have hitherto seen) you cannot form an adequate idea, even though you pictured to yourself all the fine plants of our hot houses growing wild and clothing the hills and valleys with their utmost luxuriance. At the Cape of Good Hope you are walking in a richly stored greenhouse: here you walk into one of the great hothouses of Nature. . . . Mountains and rocks, forests and rivulets and plants of remarkable forms combined in the most picturesque manner, tempt one to turn often from Natural History to Painting."

There are over two hundred of Burchell's Brazilian drawings in the Gubbins collection, but very few are botanical sketches. In Plate XI, there is reproduced his drawing of the palm trees, to which he makes very frequent reference in his letters.

In Hooker's *Botanical Miscellany*, Vol. II, p. 128-133 (1831), there is an account of "Mr. Burchell's Brazilian Journey." The article gives the contents of two letters, one written to Hooker, from Goyaz in April, 1828, and the other from Fulham in November, 1830, immediately after Burchell's return to England.

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* The Linnean Society of London. Letters MSS.

In 1905 Professor (now Sir) E. B. Poulton gave an address in Cape Town and it was afterwards printed in the *Report of the British and South African Associations* (*Science*), Vol. III, p. 57-110 ; in it Burchell's Brazilian journey is described. These are the only published accounts of his South American travels. Some more detail may be added to them from letters written to his relatives, to Swainson and Salisbury, and from the manuscripts dealing with his herbarium.

ROUTE.

The map, Plate XII, gives a very general idea of the ground he traversed. He encountered many difficulties when he came to arrange his itinerary, and much of the country he actually passed through was other than what he wished or planned to visit.

He remained in Rio from July, 1825, till February, 1826, and all that time was endeavouring to obtain official permission to journey across country to Peru. A commercial treaty between Britain and Brazil was concluded in November, 1825 ; but the embassy had to remain in the country till the official ratification of it arrived from England. One of the members, Dr. Ridgway, was released from his duties, and as he was returning to London, Burchell sent in his care the first consignment of his botanical, entomological and mineral collections, as well as many drawings.

He made a short excursion into the Province of Minas Geráës in November, and in January, 1826, he writes hopefully about engaging a servant to go with him and natives to drive his mules, but March sees him still in Rio. In a letter* to his sister Mary, he says :—

> " About the end of last November, when Sir Charles was likely to leave Rio for some time, I requested him to solicit from the ministers of the Emperor the proper passports and recommendation for me on my intended journey ; this he told me he did the same day and the prime minister promised to do all I wished. But the day after Sir C. sailed, there was a complete change of ministers and the business fell to a new man into whose hands my letter of request went as one of the papers of office and about a couple of weeks afterwards, I received through the English Consul two letters addressed to the governors of the two districts I should have to travel through. These appeared to me and to the Consul not sufficiently strong in their recommendation and he immediately went to the then minister and taking a copy of my *Travels* with him, explained more clearly who I was and what I wanted. The

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* Letters written to his family are in the Library of the Hope Dept. of Zoology (Entomology) Univers. Mus. Oxford.

> minister was till then quite in the dark: but in consequence of this explanation he sent to the Consul a better and more full passport and an additional and more flattering recommendation. Thus this business now stands. The ministry was again changed by the emperor soon after I got my last passports. I have never seen Sir C. since the day I have above alluded to (end of Nov.) but I hope he will return from Bahia (for he is gone there again in pursuit of the Emperor) before I finally leave Rio."

His patience was sorely tried and he did not manage to get away from Rio till September, 1826; but in the meantime he made a short excursion in the Serra dos Orgáons (Organ Mountains) and another into the Estrella Mountains, and philosophically writes to his sister:—

> "My protracted residence in this part of Brazil not only prepares me better for my journey: but, by completing more fully the collecting of what may be found about here, lessens in proportion that which I should otherwise find to do on the road. I already know much more of the Portuguese language than I did of the Dutch before I started from Cape Town; and all my collections, observations and drawings are already more than double those which I made in Cape Town before I commenced my journey. I mention this merely to show that my eight months' residence here has not been mis-spent. I have received no letters from any one except one lately from Dr. Hooker. Remembering that I am indebted for some specimens to him in return for some he gave me at Glasgow, I shall take an early opportunity of sending him an equivalent in kind, by a vessel going to Glasgow direct."

Writing to his father in August, 1826, he says he is expecting to leave Rio in September; that he has received an additional passport from Lord Ponsonby who was at Rio on his way to Buenos Ayres as British envoy; that he intends shipping all the collections he had beside him to England, and remarks:—

> "My intended journey seems to have excited a good deal of interest among the Europeans here; but the illiterate Brazilians take no notice of it."

He planned to go from Santos to San Paolo and there procure a troop of twenty mules and horses with four or five hired attendants as muleteers. He would then proceed to explore the provinces of San Paulo, Goyaz, Cuyabá and Mátto-grosso, and pass into Peru with the intention of staying at Cuzço in order to examine the antiquities of the empire of the Incas both there and in the country surrounding the great lake of Titicaca. He thought he might then go to Lima and finally make his way to Buenos Ayres.

He was well warned that he would not be able to carry out this plan, for there were innumerable obstacles to hinder the progress of a scientific traveller encumbered with a quantity of baggage and instruments.

Undaunted, he sailed from Rio and arrived at Santos on 12th September, 1826, and remained there for three months. He carried with him, besides his passports, eighty-four letters of introduction for use on his journey, and was looking forward to what lay beyond San Paulo,

> " as all the road may be said to be unexplored ground with respect to Science, for only one or two collectors have visited it, and these have not yet published any account of it."

He despatched many specimens and drawings from Santos, and after exploring the neighbouring districts, and living for three months in a solitary hut in the middle of the forests at the foot of the great range of mountains, Sierra da Cubatao, he reached San Paulo in January, 1827.

He was now nearly under the Tropic of Capricorn and his collections were already more than half that of his African. His latest herbarium number was now 4,626, and, what was more important, all the specimens were fully described.

At San Paulo there were no inns or lodging-houses, but he was " able to rent a house of eight rooms, on the edge of the city, for about six shillings a month ". What a contrast to his South African wagon !

The rainy season caused delay, and he admits in a letter written to his mother in June, that he was rather depressed. He found the people dilatory and wearing out his patience when dealing with them, " for what might be done in a day they often required a month." He made all his excursions around San Paulo on foot and added much to his collections. Before setting off for Goyaz he despatched what he had gathered to Santos for shipment to England.

He arrived at Goyaz in November, 1827, where he remained for nine months ; while there he learned of his father's failing health. He decided to change his plans, to cut out his proposed journey to Peru, and make for the northern port of Pará and, from there, sail direct to England.

He was the first Englishman to enter the city of Goyaz, and in it, he spent the rainy season of 1827.

His American *Catalogus Geographicus* number had now reached 7,063, and he remarks in a letter* to Hooker :—

> " In this country of illiteracy, no one is found to whom notions of science are intelligible. Here Nature has done much—man nothing : here she offers him innumerable objects of admiration

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* *Hooker, Sir W. J.* Letters MSS. Vol. LXVI. No. 17, Kew.

> and study, yet he continues to vegetate in the darkness of ignorance and in extreme poverty, the consequence of laziness alone."

He certainly did not follow the example set him; for his collections increased enormously, and he was able to do what he could not do on his South African journey, keep the descriptions in the *Catalogus Geographicus* fully written up.

Still bearing northwards, he reached Porto-Real—Porto Imperial, now Porto Naçional—on 14th November, 1828, and there he had to remain till it was a suitable season to descend the Tocantins River to Pará. In doing this he traversed a route then unknown to science. He reached Pará in June, 1829, but was not able to secure a passage from there till February of the following year. He arrived at Dover on 24th March, 1830. It was a sad home-coming for him, for his father had died in 1829, and as head of the family he had to assume responsibilities for which he was little inclined, but which he faithfully and dutifully performed.

HIS COLLECTIONS.

As has been already noted he had shipped packages of collections from various ports on his route, and though there had been many great difficulties with regard to transport on the last part of his journey, he was able to arrive in England without having lost anything. He had profited by the experience of his South African travel, but had found the tropical climate a great handicap when pressing his specimens.

In his Memoranda Botanica MS. I, Part II, he notes that he did not begin to unpack the Brazilian herbarium, which consisted of one hundred and thirty-two packages, till February, 1847, and dealing with the specimens at the rate of three to thirty-five a day, he did not finish till February, 1850.

When writing to Hooker and to Swainson, he told them that a pretty large building would be required if the material was to be arranged for examination, for he had now a herbarium of 140,000 specimens.

It may be well to reproduce here his own account which he gave to Dr. Hooker,* for the *Botanical Miscellany* is not easily accessible to some people who may read this paper. Writing from Fulham on 4th October, 1830, he says :—

> "I hope indeed that the time will soon come when I may enter upon the great and interesting task of arranging my collections : for I now possess 15,000 species of plants, all gathered by my own hand in their natural places of growth. The most numerous order of plants in Brazil (that is from the tropic of Capricorn to the Equi-

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* *Hooker, Sir W. J.* Letters MSS. Vol. LXVI. No. 18.

> noctial Line, the northern limit of my travels) is the Compositae. Then follow the Gramineae, Rubiaceae, Malvaceae, Melastomaceae. Myrtaceae, Leguminosae, Orchideae, Terebinthaceae, Euphorbiaceae, Cyperoideae, Aroideae, Malpighiaceae, Acanthaceae, Bignoniaceae, Convolvulaceae, Apocineae, Scrophularineae, Solanaceae, Scitamineae, Guttiferae, Bromeliaceae, Urticeae, Salicariae, Annonaceae, Tilliaceae. These, though mentioned rather at random, will give you an idea of the Botany of my Brazilian Journey. It is remarkable that I scarcely found a single representative of the Order Cruciferae.
>
> " According to an account kept in my geographical catalogue during my travels, I find I have 7,022 species, including a few I collected in Portugal, Madeira and Teneriffe. Probably I shall resolve on building another room or two to receive my collections ; unless I can find a larger house near London which would in other respects be equally convenient with this I now inhabit ; but I fear this would not be easily found. Your idea of engaging a person as Librarian or keeper of the collections, is one that ought to be adopted ; but then unfortunately I have neither convenience for receiving such a person, nor the pecuniary means of supplying his salary. And I am already well aware that without some such assistance my progress in publishing my observations and discoveries will be slower than it ought to be.
>
> " Of the fine things published by S. Hilaire, Martius and Pohl [all dealing with South American botany], most are familiar to me together with many others that are not noticed by them. While writing of such glorious things as I have met with, I lose all patience on feeling my hands, as it were, tied up from beginning to work on them."

In a letter* written to Hooker on 1st November, 1830, Burchell gives an account of his itinerary under " a few heads which you may arrange or make use of as you please." He then goes on to say :—

> " I fear I shall lose much time before I am comfortably settled : nothing is more distressing to me than thus to be forced to delay my labors in arranging my collections and rendering them useful to science. . . . I cannot bring my mind to abandon any branch of natural history for the sake of giving more time and attention to any one in particular : although I know this is wrong and can never lead to perfection in any. Still, the contemplation of the whole system of created objects, is so fascinating, that it is very difficult to turn away from all but a few.

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* *Hooker, Sir W. J.* Letters MSS. Vol. LXVI. No. 19, Kew.

> "I have never heard of any 'person at the Cape leaving me a large sum of money'. Should it be so, I doubt whether I should be so glad at the good fortune, as sorry at the loss of a true friend, for such must be the person whose feelings would lead him to such an act. The newspapers are not to be believed: nor can I imagine the least foundation for such a report."

This rumour may have arisen from the fact that when R. A. Salisbury died in 1829, Burchell was his sole executor, and from the estate received about £6,000.

To Hooker's request for a description, in general terms, of the vegetation of Brazil, he replied :—

> "You have from all quarters heard the most animated descriptions of the luxuriance and richness of the vegetation of Brazil: and with these I most warmly agree. But this is become almost a fashion, and in Europe, it seems the general opinion that the *whole* of that country is covered with the most magnificent forests, and of gigantic growths. This idea, though correct with respect to all the maritime districts, the courses of the rivers and the greater part of the country lying under the equinoctial line, is, however, not at all applicable to vast tracts in the provinces of San Paulo and Goyaz.
>
> "There I have traversed boundless plains or open regions, some of them covered with fine pasture, formed by a great variety of the most interesting Gramineae: others with grasses intermingled with small plants and shrubs of the fine-leaved Melastomaceae, the Malpighiaceae, the herbaceous Rubiaceae, and Compositae: others with a varied clothing of annual and perennial flowers (although most disappearing during the dry season), faintly shaded or protected by extensive groves of low trees, of singular and stunted growth, rarely growing so close together as to form a thicket or impede the traveller. These arid groves have sometimes reminded me of the Acacia groves so predominant over the plains in the interior of Southern Africa. Yet it is rarely that one can compare African with Brazilian botany: their character, in many particulars, differs so widely: but I was a long time in Brazil before I saw such large trunks of timber as I have observed in some of the forests of the Cape Colony. I allude to the Podocarpi. These forests are indeed of no extent compared to those of America: but they afford specimens of sylvan scenery for the painter not less grand and beautiful: although they are generally deficient in that most splendid and noble feature, the Palm. [See Plate XI.]
>
> "When, however, we descend towards the low latitudes of

Brazil, the glorious magnificence of the forests is truly astonishing, and none but those who are born in the midst of them can view such imposing productions of Nature without a feeling of awe or respect. She overloads herself, and one object oppresses and smothers another in the general struggle for luxuriance.

"The Bertholletia, and some species of Bombax, far overtop their vegetable brethren: and the trunks of the latter are really stupendous, both in height and thickness. I say nothing of the climbing plants, as they have been lately so often described: but we never can be silent with respect to the Palms: they abound in every latitude and situation, and their variety is far greater than any one traveller can form an idea of. They are of every size, from that of an ordinary herbaceous plant to that of the highest tree of the forest: but I think none surpass the Buriti or Miriti (*Mauritis vinifera*, Mart. tab. 38) in grandeur and imposing beauty: although his plate does not convey an idea of this character.

"Another plant of most extraordinary aspect and magnificence is the Araucaria: but this I never saw much to the northward of the city of San Paulo. It is only found at a great elevation, and I believe is not known to exist in the provinces of Goyaz and Pará.

"You ask whether the Barbaceneae abound. Of these I have found but few (if I recollect rightly), but the Vellosiae, their nearest relations, cover whole plains in different latitudes in the interior: never in the forests. They give a singular and strange character to the landscape, not to be represented but by the pencil: they resemble some Dracenae. The Melastomaceae are found everywhere, and in every situation.

"The Vochisiaceae are numerous, and many are most beautiful flowering-trees, and afford excellent timber: they also affect various localities as do also the Myrtaceae. The Laurineae are numerous, particularly to the southward: but in Pará are species producing the finest cinnamon, and a kind of nutmeg is also found there.

"I conclude for want of room, but if you will mention what further information you wish, I will most readily resume the pen by return of post."

Naturally Hooker did not include that last sentence when he published the Burchell letter in the *Botanical Miscellany*, but it is, nevertheless, of some importance.

Burchell offered more from his pen but neither Hooker nor anyone else asked for it just when he was in the mood to give, and soon after this he was in the throes of legal matters as executor of the estates of Salisbury and of his father, so he did not continue writing.

His Brazilian Journals are still missing and that being so what he wrote to Hooker is all the more precious.

HIS MANUSCRIPTS.

He adopted the same method that he had used in South Africa when recording the particulars about the botanical specimens he gathered, and his *Catalogus Geographicus Braziliensis*, consisting of nine volumes, is in the Library of the Herbarium, Royal Botanic Gardens, Kew. It was more fully written up in the field than was his South African catalogue, for, as has been previously stated, he was frequently held up for long periods for lack of transport in Brazil and so had more time for writing than he had in South Africa.

There are many notes inserted in Part II of the *Memoranda Botanica*, which is the *Memoranda relating to Herbaria of Portugal, Madeira, Teneriffe and Brazil.*

Until such time as this world war ceases, there is no possibility of checking what notes have been made of these entries, so, for the present, no particulars of them will be given.

Pasted on to the last page of the volume is the following piece of gossip :—

> "February, 1824, 25 Wednesday. Employed the rest of the day in the Library of the Linnean Society examining my African insects. Mr. Don [Librarian of the Linnean Society] tells me the following history of the manner in which Lambert became possessed of Ruisz and Pavon's herbarium—'Ruisz and Pavon were so ill paid by the Spanish Government (their salary being many years in arrears) that they were almost starving or in the greatest poverty at Madrid, and at this time necessity drove them to offer their herbarium of 8,000 species to Sir James Smith for £600 who, being himself too poor to purchase, he proposed the bargain to Mr. Lambert who happening at that time to be in a very nervous and ill state of mind and body, hesitated as to accepting the terms. In the meantime Pavon had obtained some money from other sources in Madrid, and afterwards when Lambert had made up his mind to his terms (£600), they refused to sell at that sum, and the result was that Lambert paid £1,500 for the herbarium, besides what he paid for the books and engravings belonging to the Flora Peruviana.' Whether this is a true statement of the transaction, I do not myself venture to affirm."

No doubt this story was inserted because, at the date when Burchell wrote it, he was contemplating a visit to Peru. His wanderings did not altogether finish when he settled at Fulham in 1830, but they were of a different nature to those he undertook in South Africa and Brazil, and will be considered in Part IV of this article.

BIOGRAPHICAL NOTES.

(38) SWAINSON, WILLIAM (1789-1855), spent his youth in Liverpool. He was keenly interested in Natural History. In 1807 he obtained a post in Malta. On the conclusion of peace he retired, but his love for travel took him to Brazil in 1816. In 1828 he visited Paris under the guidance of Cuvier and St. Hilaire. He went to New Zealand *via* Rio in 1837. He was engaged by the Government of Tasmania and Victoria to report on the timber trees of those colonies. He died in New Zealand.

(39) KER, J. BELLENDEN- (1765-1842), was for some time known as John Gawler, but in 1804 he was granted a licence to take the name of Ker-Bellenden though he was invariably known as Bellenden-Ker. In 1804 he wrote *A Memoir of Iridaceae*. He was editor of the *Botanical Register* from 1815-23. His last important botanical work was *Iridearum Genera*, published in Brussels in 1828.

(40) EDWARDS, SYDENHAM T. (1769-1819). was a draughtsman. From 1798-1814 he made all the drawings for the *Botanical Magazine*. From 1815-1819 his work was published in the *Botanical Register*.

(41) HERBERT, WILLIAM (1778-1847), was a son of the first Earl of Carnarvon. He entered Parliament in 1806 but retired in 1812. He was ordained in 1814 and nominated to the valuable living of Spofforth in Yorkshire. He left there to become Dean of Manchester in 1840. For many years the pages of the *Botanical Register* and the *Botanical Magazine* were enriched by articles from his pen, particularly on the subject of bulbous plants. His standard work on *Amaryllidaceae* was issued in 1837.

(42) SMITH, SIR JAMES E. (1759-1828), was born at Norwich. He entered Edinburgh University to study medicine, but he abandoned that and took up botany as a career. He went to London where he formed a friendship with Sir Joseph Banks. He bought the Linnean collections, and when in 1814 the Linnean Society received a Royal Charter, he became the first President and received a knighthood. He was a man of means, and because of his lectures, researches, writings and collections, was universally acknowledged to be the outstanding authority on botanical science of his time.

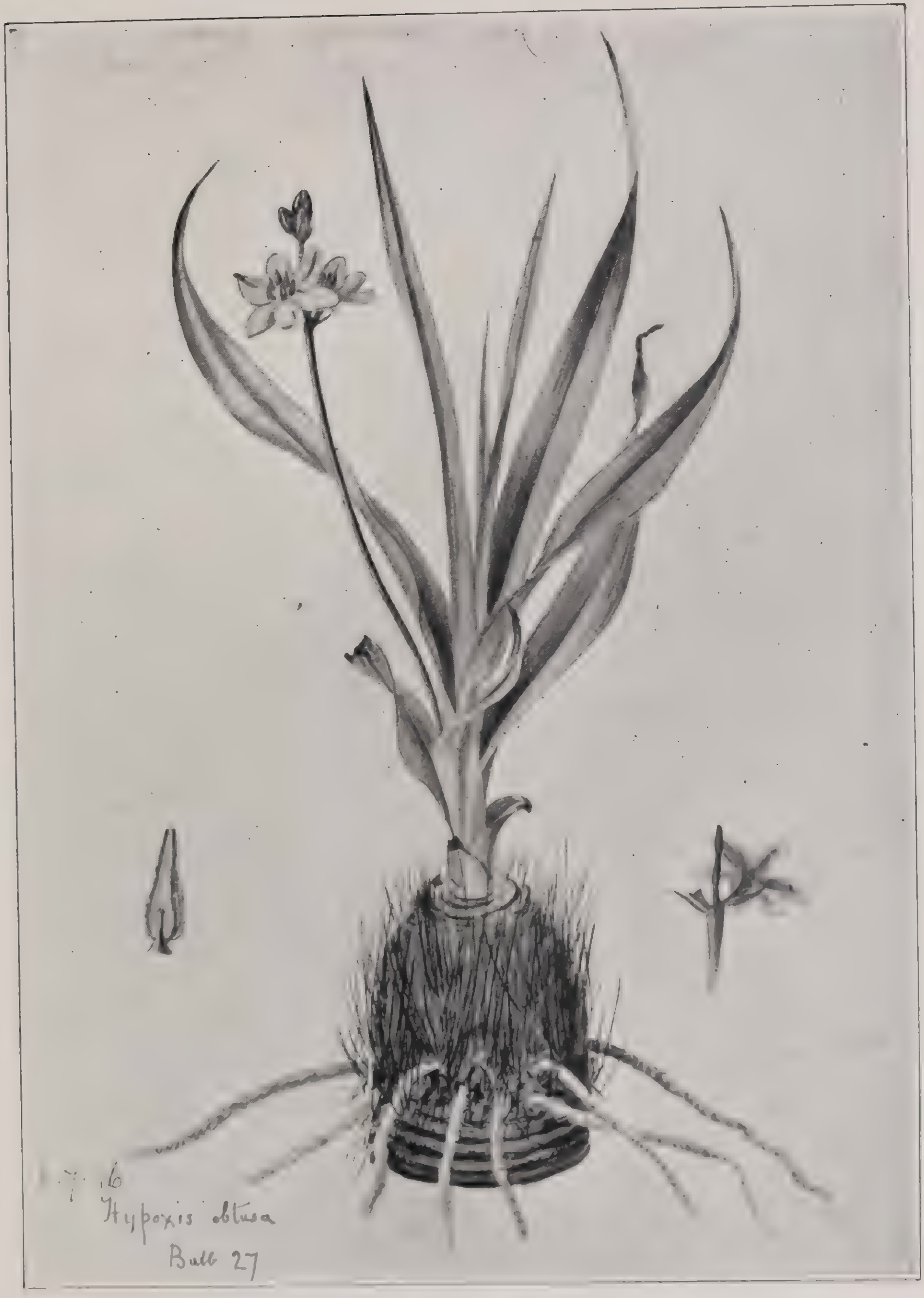
(43) BROWN, ROBERT (1773-1858), began life as an army surgeon. Banks offered him the post of Naturalist to the *Investigator*, Captain Flinders (1801-5). His researches into the reproduction of plants were marked by discoveries which carried him as far as the conditions of the time allowed. He succeeded Dryander as Banks' librarian.

(44) AGARDH, CHARLES ADOLPHE (1785-1859), was Professor of Botany at Lund, Sweden. He was a member of the Swedish Acadamy and of the Academy of Science at Stockholm. His principal work was done in connection with *Algae*.

(45) WINCH, NATHANIEL (1769-1838), was one of the earliest writers to take philosophical views of the geographical distribution of plants. He studied Cryptogams, especially Mosses. He became an Associate of the Linnean Society in 1821, and to it bequeathed his MSS., library and herbarium, but a large part of it was ultimately handed over to the Natural History Society of Northumberland and Durham.

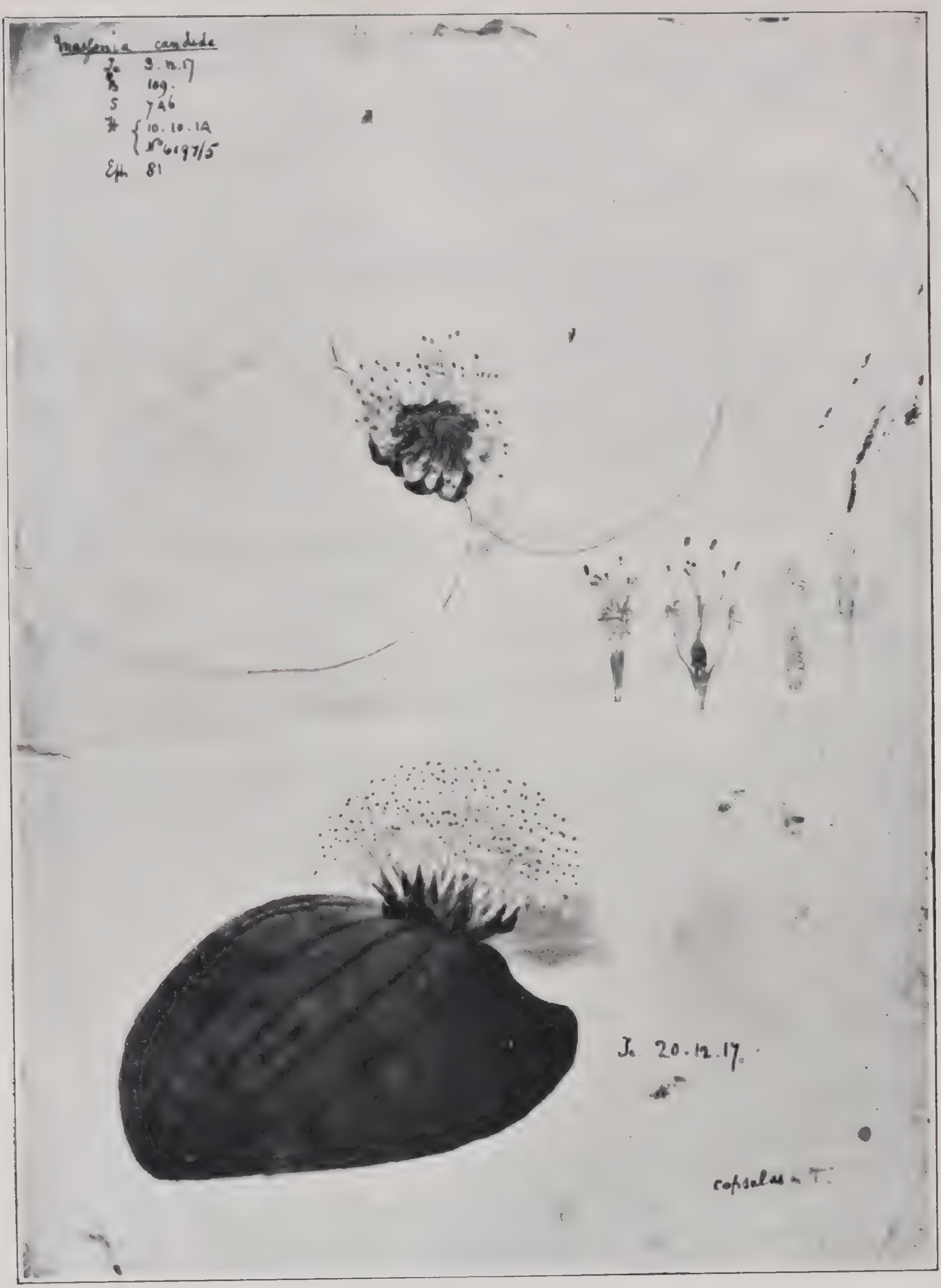
(46) ARNOTT, GEORGE A. W. (1799-1868), was born in Edinburgh and abandoned law for botany. He became acquainted with Greville and Hooker. In 1821 he worked in Paris and published two papers on Mosses. He returned to Scotland in 1831 and for ten years he published descriptions of new plants from South America and India. He was associated with Hooker in the work *British Flora*. He succeeded Hooker as Professor of Botany at the University of Glasgow.

PLATE IX.



Hypoxis obtusa.

Drawing : Wm. J. Burchell. By courtesy of Mrs. G. Burchell:
Photograph : James L. Smith, Johannesburg



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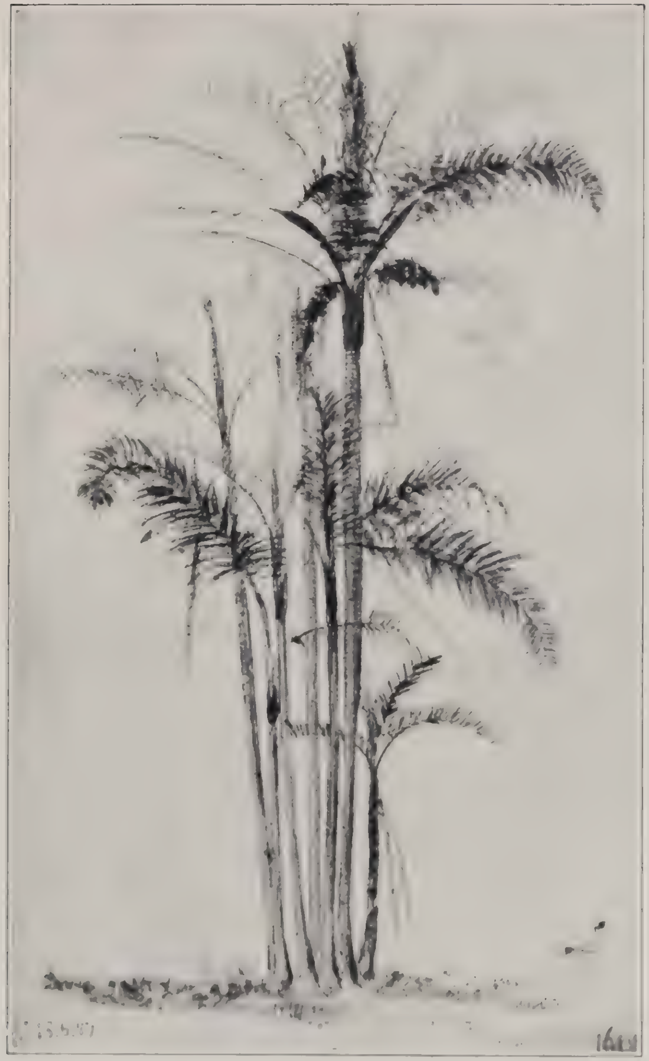
Massonia longifolia var. candida.
Drawing : Wm. J. Burchell. By courtesy of Mrs. E. Burchell.
Photograph : James L. Smith, Johannesburg.

PLATE XI.



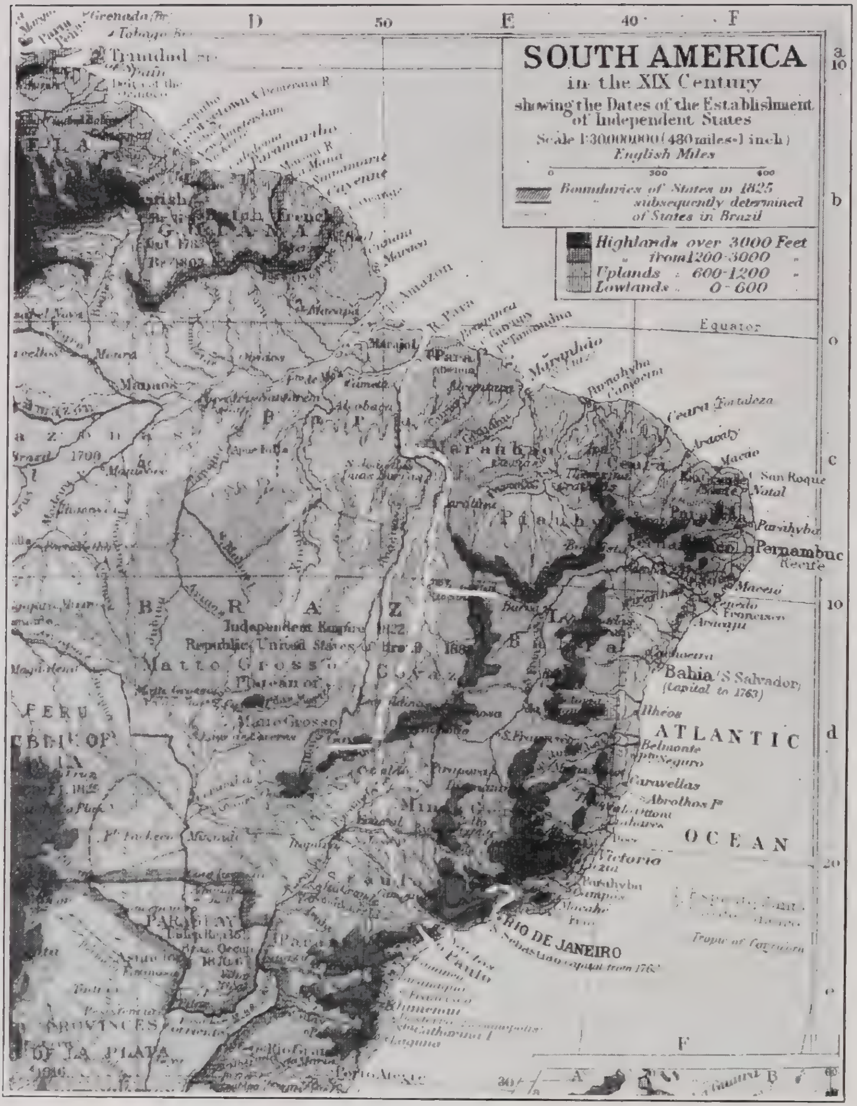
Palms at San Paulo.

Drawing: Wm. J. Burchell.

Copyright by the Gubbins Trustees.

Photograph: James L. Smith, Johannesburg

PLATE XII.



Map showing Burchell's route in Brazil.

NOTES ON COTULA AND THE DESCRIPTION OF A NEW SPECIES.

By Margaret R. Levyns.

Cotula is a widely distributed Linnaean genus, well represented in South Africa. On the Cape Peninsula seven species have been recorded though *C. bracteolata* E. Mey. ex DC is a somewhat doubtful species and may be an abnormal form of *C. filifolia* Thunb. In this area all the species are heterogamous with stalked, marginal, female flowers, a character common to this genus, Cenia and Otochlamys. These two latter genera are usually accepted as sufficiently distinct from Cotula to warrant generic distinction, but after a careful examination the author has been forced to the conclusion that the line of demarcation is so poorly defined that the case for upholding separate genera cannot be maintained.

Cenia turbinata was first described by Linnaeus as *Cotula turbinata* and was subsequently transferred to Cenia by Persoon. The two features by which this is separated from Cotula are the hollow floral axis and the presence of ray flowers. In several species of Cotula the top of the floral axis is loosely spongy and in a few large specimens of *C. vulgaris* sp. nov. a small but definite hollow was observed. In *Cenia turbinata* the degree of inflation is variable. In the same species the outermost flowers of the capitulum are female, devoid of a corolla and stalked exactly as in Cotula. The outermost row of corolla-bearing flowers has the outer corolla lobe much larger than the other three, and these are the so-called ligulate flowers. It need hardly be emphasised that neither of these characters is a suitable one as a basis for generic distinction and for this reason it is proposed to revert to the old Linnaean name *Cotula turbinata*.

The genus Otochlamys was founded by De Candolle for a peculiar plant which he named *Otochlamys eckloniana*, in which the base of the corolla is prolonged into a flap of tissue wrapping round the ovary like a cloak, suggesting the name. When studying the floral structure of *Cotula pusilla* Thunb., it was found that here the corolla is pouched at the base and folds over the top of the ovary, thus connecting the ordinary type of corolla in Cotula with that of Otochlamys. In the involucre, too, *C. pusilla* bridges the gap as its inner involucral scales are scarious though not quite as conspicuous as those of *Otochlamys eckloniana*.

With *C. pusilla* as a connecting link, it becomes difficult to uphold the genus Otochlamys and for this reason it is proposed to abolish it and institute a new combination **Cotula eckloniana** Levyns.

Two quite distinct plants have been called *Cotula filifolia* Thunb. in South African collections. One is usually larger than the other and was treated by Harvey in the Flora Capensis as a variety which he named *C. filifolia* var. *decumbens*. Without seeing Thunberg's specimens it is impossible to be quite certain which of the two species he described as both grow, often together, in wet spots near Cape Town. Most of the spots answering this description have long since been built over, but Paarden Island still remains, and here both species grow in abundance. However, the probability is that the slightly smaller plant

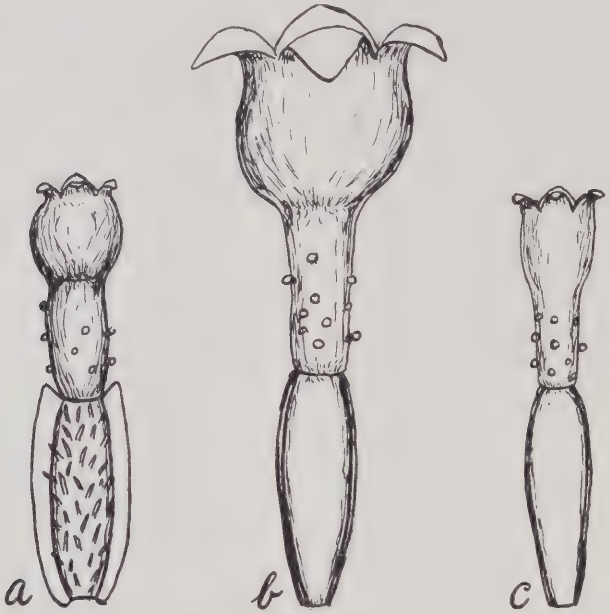


Fig. 1. (*a*) Bisexual flower of *C. filifolia* Thunb. (posterior view). Drawn from living material collected on Paarden Island × 30. (*b*) Bisexual flower of *C. vulgaris* sp. nov. Drawn from living material collected on Kenilworth Racecourse. This plant had a glabrous ovary but forms with a few hairs on the posterior face occurred as well × 30. (*c*) Bisexual flower of *C. filifolia* Thunb. (in the previously accepted sense). Drawn from dried material collected at Melbourne, Australia × 30.

is *C. filifolia* Thunb. and the other an undescribed species for which the name *C. vulgaris* is proposed, as in most parts of the Cape Peninsula it is more common than *C. filifolia*. Harvey's name *decumbens* cannot be used as Persoon had used it for another plant in the genus. Apart from its smaller size *C. filifolia* may be distinguished from *C. vulgaris* by its tubular flowers which have a corolla with small lobes and a definite wing on either side of the ovary (Fig. 1, *a* and *b*). This wing may become much thickened in the fruit. In many specimens of *C. vulgaris* the leaves may be slightly lobed whereas in *C. filifolia* only simple leaves have been observed.

Cotula vulgaris Levyns. (*C. filifolia* Thunb. var. *decumbens* Harv.). Planta annua, glabra. Folia filiformes, interdum pinnatipartita. Pedunculi 1-cephali. Bracteae latae, obtusae. Tubus corollae florae bisexualis supra inflata, lobis reflexis. Fructus non alatus sed saepe margine paulo crasso.

Annual plant, glabrous in all parts excepting within the leaf sheaths, erect or creeping with alternate leaves. Leaves simple or filiform, frequently with some leaves pinnately lobed, with rather long hairs within the leaf sheath. Involucral bracts few in number, broad, obtuse. Marginal flowers with a very reduced corolla or none ; ovary with a wide wing, glabrous or nearly so. Central flowers tubular, much inflated above and well developed, reflexed lobes ; ovary somewhat flattened, with a thickened, rim-like edge but not winged. Fruit of marginal flower winged, that of the central flower with a small thickening along the flattened edge, glabrous or with some bristles on the posterior face.

Common in pools and damp places on the flats. Flowering season principally from July to September but may be found at any time in damp places.

Type. Levyns 6775, Kenilworth Racecourse (Bolus Herbarium).

Additional interest attaches to *C. filifolia* Thunb. in that it has long been recognised as native in Australia as well as in Africa. In view of the fact that two species have been given this name in South Africa it is a matter of some interest to determine which of the two South African species is represented in Australia. Through the kindness of the Director of the National Herbarium at Melbourne, I have been able to examine some specimens collected in Melbourne. They look very much like *C. filifolia* Thunb. in the sense in which it is used here, but there are small differences which may prove to be constant. (Fig 1, *c*.) If so, the Australian plant would have a good claim to be regarded as a distinct species. These differences are :—(1) The presence of some hairs on the stems and peduncles, whereas the African plant is glabrous excepting for a few hairs within the leaf sheath. (2) A relatively shorter corolla which is usually slightly less than the ovary in length. (3) The absence of wings on the ovary of the bisexual flower. It seems likely, therefore, that three species will have to be recognised in place of one, but the Australian problem is one that can only be settled in that country and for the present the recognition of two South African species must suffice.

I wish to acknowledge my indebtedness to the National Research Council and Board for a grant which has been used in connection with this research.

SOME OBSERVATIONS ON *ERIOCEPHALUS UMBELLULATUS* CASS.

By Margaret R. Levyns.

In the first edition of the Species Plantarum *Eriocephalus africanus* is the only species described by Linnaeus. The references to figures and descriptions given there make it highly probable that the plant thus named was the extremely common plant in the south-western districts of the Cape Province now known as *Eriocephalus umbellulatus* Cass. There is a type specimen of *E. africanus* in the Linnaean herbarium so that at some future date it will be possible to verify this assumption. The purpose of these notes is to place on record some observations made on plants of this species growing in the Cape Peninsula. These show that several of the characters made use of in separating the species in this genus are of little value.

The Leaf. The leaves are normally placed opposite one another on the stem but departures from this rule are so frequent that this character is of no practical importance. The leaf varies greatly according to habitat. When growing on dry slopes not far from the sea the leaves are usually somewhat fleshy and silvery in appearance. In more sheltered places the leaves lose their extreme fleshiness, are more slender and less silvery. The length of the leaf is most variable, the average varying from plant to plant and also on the lower and upper branches of the same plant, so that it soon becomes obvious to a field observer that leaf length is a character which must be used with extreme caution when attempting to separate two species. Examination of a large number of plants shows that whereas some plants may have all the leaves simple, it is more common to find some of the leaves lobed. In general it may be stated that the leaves borne in the centre of a bush or sheltered in some other way show a strong tendency to be lobed whereas the exposed leaves are more often entire. Some idea of the normal variability in leaf form on one bush may be gained from Fig. 1*a* where four leaves from one bush have been drawn to the same scale. It is therefore obvious that when Harvey selected entire as opposed to lobed leaves as a diagnostic character in his key to the species in the Flora Capensis, he made use of an almost useless feature in this particular group of plants.

The Capitulum.—In this genus the involucre is said to be double and in the Flora Capensis a good deal of stress is laid on the fact that in some species the inner involucre is septiferous within and in others not so. This feature has puzzled most botanists who have attempted to unravel the mysteries of the so-called specific distinctions in this genus. The explanation of this apparent difficulty is quite a simple one.

The outer involucre consists of about 5, more or less, free, silvery bracts, each with a raised, green, central portion and a scarious margin fringed with hairs. The inner involucre is quite different and consists of a few united, scarious, hairy bracts which become coriaceous at the base. The number of ray flowers varies from 3 to 5 and there are several tubular flowers in the centre. Each tubular flower arises immediately within a hairy, scarious bract, much like the inner involucre in texture and hairiness, but in the inner ones at any rate lacking the firm coriaceous base. No free bracts accompany the ray flowers but a lobe of the so-called inner involucre lies immediately without each ray flower. It is quite clear that the inner involucre is nothing more than the fused bracts of the outer flowers of the capitulum. In many cases these bracts belong entirely to the ray flowers, but in several cases a few of the bracts of the

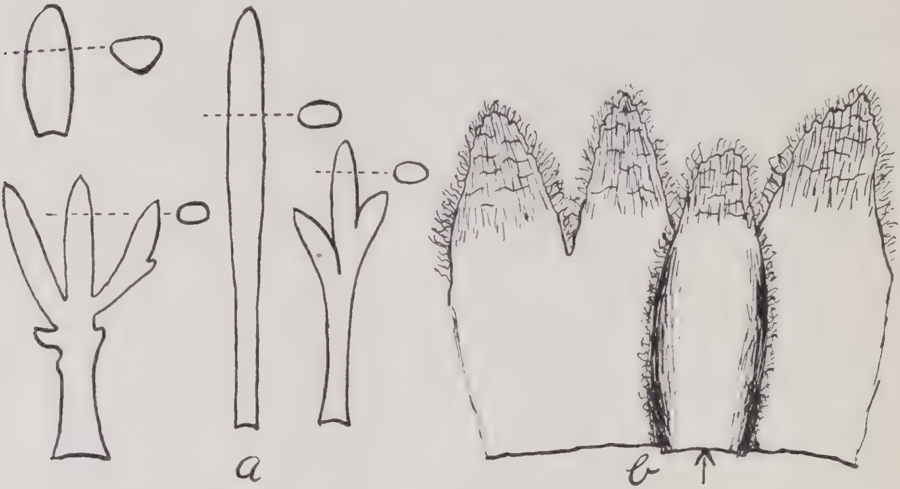


FIG. 1. *a*. Four leaves from the same plant, showing range of form and size. The outline of each leaf in section is given × 4. *b*. Part of the inner involucre spread out and viewed from within. In this case there are three bracts belonging to the ray flowers and one, partially fused with the outer ones, belonging to a tubular flower. This bract, marked with an arrow, has its edges free from the outer bracts forming the so-called septa × 15.

outer tubular flowers are seen to take part in the formation of the inner involucre. Such bracts of the tubular flowers either fuse completely with the bracts of the rays or only partially so. When the fusion is complete the involucre is quite smooth within. In cases of partial fusion, however, the edges of some of the bracts of the tubular flowers remain free and project on the inside of the involucre (Fig. 1*b*). These are the septa of various authors. As the bracts of the tubular flowers when united to the inner involucre show every stage from complete union with it to independence, it is apparent that the presence of septa is of no special significance. Both septiferous and non-septiferous involucres may occur in different capitula on the same plant.

In view of these observations on the leaves and capitula of this common species of Eriocephalus, the validity of some of the species of the genus given in the Flora Capensis becomes highly questionable. *E. umbellulatus* Cass. is separated from *E. africanus* L., *E. septulifer* DC. and *E. sericeus* DC. largely on account of its entire leaves, a character which has been shown to be quite useless for diagnostic purposes. *E. africanus* and *E. septulifer* are distinguished from *E. sericeus* by the presence of septa within the involucre in the former species. This character, too, is quite valueless. Finally, the length of the leaf which is the only important character separating *E. africanus* and *E. septulifer* is one largely controlled by the habitat. No reliable character remains by which these species may be distinguished from one another, and it is an obvious conclusion that they are all modifications of the same species. The name which appears to be the legitimate one for this species is *E. africanus* L., but for absolute certainty the type specimen must be examined and this, under the present circumstances, is impossible.

I wish to acknowledge my indebtedness to the National Research Council and Board for a grant which has been used in connection with this research.

NOTES ON SOME SPECIES OF OTHONNA.

By Margaret R. Levyns.

In a list of the plants of the Cape Peninsula published in 1904, Bolus and Wolley Dod included *Othonna perfoliata* (=*Doria perfoliata* Thunb.) and *Othonna Lingua* L.f., but expressed doubt as to whether the plants cited by them under these two names were distinct. In the Flora Capensis, where these two species are placed in Doria, *D. Lingua* is said to differ from *D. perfoliata* in its reddish pappus and less pubescent achenes. Recent examination of a very large number of plants has shown that the colour of the pappus is variable, ranging from a deep, reddish-purple to a dirty white, and cannot be regarded as having a specific value. In all the achenes examined the pubescence was remarkably uniform. There seems to be no justification for the recognition of two species on the Cape Peninsula and in this account all the plants hitherto placed in the two will be treated as one polymorphic species.

The first descriptions of *Othonna Lingua* and *Othonna perfoliata* were drawn up by the younger Linnaeus and published in the Supplementum Plantarum in 1781, the former species in the genus Othonna and the latter in Cineraria. In both cases the description is too short and imperfect to serve as a guide to the identity of the plants seen by Linnaeus. These had been collected by Thunberg, but there is no evidence available at the present time to indicate that the plants present in Thunberg's herbarium are those described by Linnaeus. No specimens have been preserved in the Linnaean collection and consequently it must be assumed that no type specimen exists. In 1797 Jacquin in Plantarum Rariorum Horti Schoenbrunnensis, Vol. II, described and figured *O. Lingua* L.f., *O. perfoliata* (L.f.) Jacq. and *O. filicaulis* Jacq. Jacquin's figures are good and there can be little doubt that his drawings are accurate representations of the plants that he saw. Only one of these plants grows on the Cape Peninsula, namely, *O. filicaulis*. The whole plant shown in Fig. 201 is an excellent representation of a fairly vigorous specimen, and it will be noted that ligulate flowers are not shown though the scale is large enough to have indicated them clearly. In the enlarged drawing of one of the marginal flowers, however, a very long and narrow ligulate corolla is shown. This dissection cannot have been made from one of the capitula represented on the whole plant, and it must remain doubtful as to whether this ligulate flower came from an exceptional capitulum of this species or was drawn from another species. There are some grounds for supposing that an exceptional capitulum may have developed in the artificial conditions under which the plants must have been grown in Vienna. Fig. 1 indicates the range of variation in the corolla of the marginal flowers drawn from plants growing under natural conditions in the Cape Peninsula. Variations of the kind figured have been noted whenever a sufficiently large number of specimens from any one locality have been examined. In no locality has the corolla been found to be constant in size or form. Fig. 1, *a* shows a rather rare type in which the corolla has been reduced to a small ring at the base of the style. In the few cases where this type has been seen the whole capitulum has been rather smaller than usual. Fig. 1, *b* is the type most commonly found. Fig. 1, *c* shows a long corolla abruptly truncate at the top as in the previous case. Fig. 1, *d* shows a corolla widening slightly at the top. This feature may appear in a corolla of any length. Fig. 1, *e* has a zygomorphic corolla which is fleshy throughout. Fig. 1, *f* shows a flower of a type which was only seen once in a plant collected at Muizenberg. In this exceptional flower a small, membranous, ligulate portion was developed, suggesting a rudimentary ray. All the other flowers in the same capitulum were of the usual truncate type. From these observations it seems possible that the capacity to form rays is latent in these rayless species of Othonna, and in view of the considerable plasticity in the corollas under normal condi-

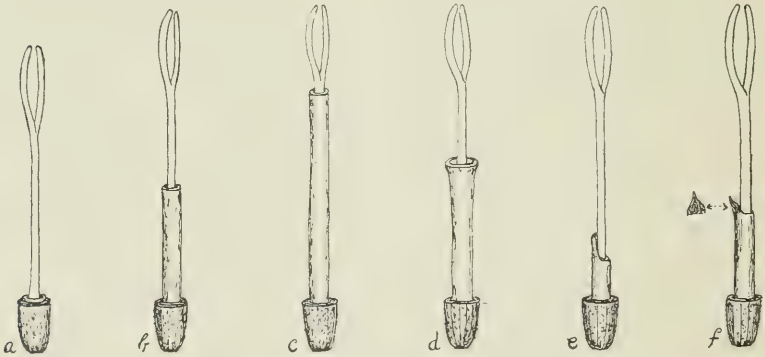


Fig. 1. Different types of corolla found on the marginal flowers of *Othonna filicaulis* Jacq. (pappus removed) × 6.

tions the author feels that it would be unwise to dismiss as an impossibility the ligulate flower drawn by Jacquin. With the exception of the ligulate flower the rest of Jacquin's plate fits this species of Othonna well.

According to Jacquin's interpretation neither *O. Lingua* nor *O. perfoliata* occurs on the Cape Peninsula. The author has not seen any species of Othonna which agrees with the figure of *O. Lingua*, though there is a possibility that it may represent an abnormal plant of *O. digitata* L.f. which is very variable in the incisions of its leaves and which in exceptional cases may have all its leaves entire. The figure of *O. perfoliata* agrees well with a plant which appears to be common, scrambling among bushes in sheltered places in the south-western districts outside the Cape Peninsula.

As there is no type specimen in existence and the description in the Supplementum Plantarum is wholly inadequate, Jacquin's figures and descriptions may be accepted as representing the two Linnaean species, *Othonna Lingua* and *Cineraria perfoliata*, and his own species *O. filicaulis*. There is no ambiguity at all up to this point. Subsequent troubles in identification date from 1800. In that year Thunberg established the unsatisfactory genus Doria for the rayless Othonnas, and retained Othonna for species with rays. *O. Lingua* L.f. was kept with the Othonnas but Harvey who saw a specimen in Thunberg's herbarium states that Thunberg's plant is not this species at all but *O. tuberosa* Thunb. De Candolle and Harvey both quote Jacquin's figure as *O. Lingua* L.f., and it remains for future collectors to discover if this species is to be found in the wild state. Thunberg transferred *Cineraria perfoliata* L.f. to Doria, which indicates clearly that the plant he had in mind was not the one figured as *Othonna perfoliata* by Jacquin, but is almost certainly *O. filicaulis* Jacq. De Candolle accepted Thunberg's definition of *Doria perfoliata* and created a new species for *Othonna perfoliata* Jacq. which became *O. amplexifolia* DC. Harvey in the Flora Capensis followed De Candolle. However, it seems obvious that as Jacquin was the first person to define these two plants clearly his names must stand, *viz.*, *O. perfoliata* for the rayed species and *O. filicaulis* for the rayless one.

As *O. filicaulis* Jacq. is polymorphic it is desirable to put on record some of the features exhibited by it on the Cape Peninsula. In sandy places on the flats, when growing in open places, the plants usually remain small and branch little. On the lower mountain slopes and elsewhere when growing under bushes (a favourite habitat) the plants may become much larger and branch freely as in Jacquin's illustration. At Llandudno, where the plants grow among bushes near the seashore, they become unusually large and fleshy. After examining plants from a wide range of localities it is evident that the small, unbranched forms merge gradually into the larger branched ones, and no sharp line of demarcation is possible.

The tuber lies dormant till the first winter rains have fallen. The first leaf to appear is borne directly on the tuber (Fig. 2, *a*) and has a long stalk the morphology of which would repay investigation. In form it is much broader than the later formed leaves and is usually cordate at the base. The subsequent leaves are borne on the aerial stem and with few exceptions are quite sessile. In addition to the aerial stems horizontal ones are produced from the tuber and run along just below the surface of the soil. These root at the nodes and new tubers are sometimes formed there as well as upright shoots (Fig. 2, *b*). This habit accounts for the fact that these plants are so often found growing in dense masses.

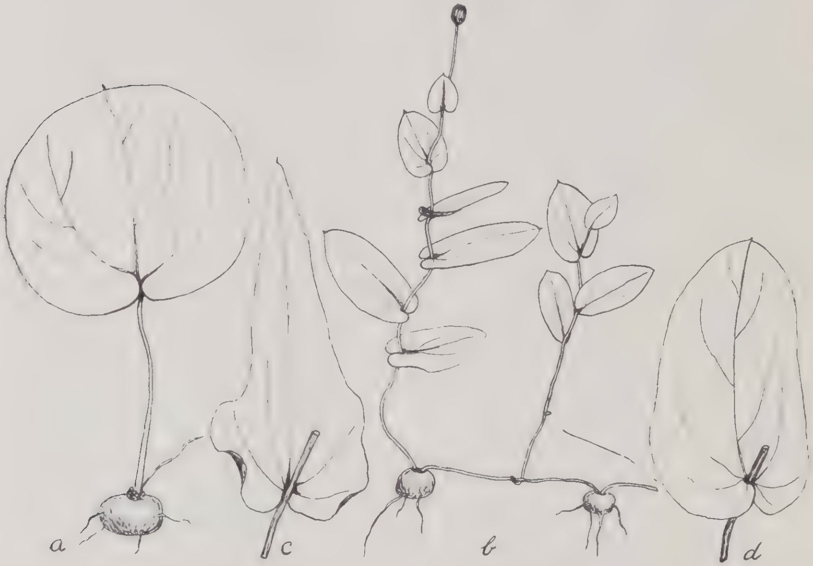


FIG. 2. *Othonna filicaulis*. *a*. Tuber producing a single leaf × ½. *b*. A small plant showing creeping and aerial stems, and tubers × ½. *c* and *d*. Two leaves taken from a large branching plant, *c* from the portion of the axis bearing the capitula, and *d* from near the base × ½.

The leaves vary much in shape. In small plants, with unbranched axes, the leaves usually have a shape similar to that depicted in Fig. 2, *b*. In larger plants the shape may alter considerably, as will be seen in

Fig. 2, *c* and *d*, where two leaves taken from the same plant are illustrated. Fig. 2, *c* is from the upper part and Fig. 2, *d* from near the base of the stem.

Othonna stenophylla Levyns nov. nom. The name *O. linifolia* L.f. is an invalid one for the tuberous Othonna to which it is at present attached. When the younger Linnaeus first published this name in 1781 it had already been used by Burmann f. in his Flora Capensis (1768). Burmann's plant subsequently became *Euryops tenuissimus* Less., but that fact does not make the present use of the name legitimate. A new name has therefore to be found for *O. linifolia* L.f. and it is proposed to call this species *O. stenophylla*.

OTHONNA BULBOSA L.—In the species Plantarum, ed. 1, a tuberous Othonna, is described by Linnaeus as *Othonna bulbosa*. He cites as references (*a*) Breyn. Cent. t. 66 and (*b*) Moris. Hist. 3 p. 111 s. 7, t. 17, f 33. Breyne's figure is an excellent one and there is no doubt about the plant he intended to represent. The author has not been able to consult Morison's figure, but in discussing it in connection with Fig. 768 in the *Botanical Magazine*, Sims writes " quae est Breynii figura contracta ". Therefore, the plant Linnaeus intended as *O. bulbosa* in the first edition of the Species Plantarum is quite clear. There is a specimen of *O. bulbosa* in the Linnaean herbarium but it was not named by Linnaeus himself and even if it should turn out to be one of the other Othonnas, it would not affect the present position. In the second edition of the Species Plantarum Linnaeus included under *O. bulbosa* an assortment of widely differing Othonnas, and it is presumably owing to this that the name was subsequently dropped in order to avoid confusion. *O. tuberosa* Thunb. is the name at present given to this species, but in view of the evidence adduced above showing that Linnaeus had one plant in mind when he first described *O. bulbosa* the original Linnaean name must be upheld and *O. tuberosa* Thunb. treated as a synonym.

The name *Othonna parviflora* L. Mant. 1 89 is antedated by *O. parviflora* Berg. Bergius' plant is not the plant occurring on the Cape Peninsula, hitherto known as *O. parviflora* L. It seems probable that the earliest name for our common Peninsula plant is *O. quinquedentata* Thunb., but a final decision must be delayed until it is possible to consult a specimen in the Linnaean herbarium, as it is possible that *Senecio rigens* L. is this plant.

I wish to acknowledge my indebtedness to the National Research Council and Board for a grant which has been used in connection with this research.

A NOTE ON ANTHESIS IN SOME COMMON GRASSES NEAR JOHANNESBURG, AND THE RELATION OF ANTHESIS TO COLLECTION OF POLLEN FOR MEDICAL PURPOSES.

By R. L. DAVIDSON

(Botanical Department, University of the Witwatersrand.)

I. INTRODUCTION AND OBJECTS.

During the past two years I have been studying a certain ecological problem necessitating work in the field at all times of the day and night. The opportunity was thus provided to observe anthesis, and notes were kept of the time of flowering in various grass species. This paper is a preliminary record of the daily and seasonal phenology of the grasses studied, together with a discussion of how pollen of grasses and possibly other anemophilous plants can be collected from plants growing naturally in the field, if advantage be taken of this knowledge.

II. A COMPARISON OF PRINCIPLES OF COLLECTING.

This discussion applies to anemophilous plants only. The accepted methods are described by Wodehouse (1935). Wherever possible the plants are picked and kept indoors until anthesis takes place. But many species do not respond; also, it appears that most species do not shed nearly as much in such conditions as they would in the field, because fewer spikelets (" flowers ") seem to open. The nearest approach to the method advocated in the present paper is that called by Wodehouse " the Plant-breeder's Method "; the latter is not popular and is used only when the other fails. In this method paper bags are tied over the inflorescences.

It is my view that, provided it is known at what time anthesis usually begins in each species, by far the most satisfactory procedure is to wait until the spikelets have opened and the extended anthers have opened their pores, and then gently to bend the inflorescences down singly or in bunches into a packet held in the collector's hand. In this way it is possible to go quickly from plant to plant and collect a few cubic centimetres of pure pollen in about half an hour. The method suggested seems to have several advantages over both the accepted methods for anemophilous plants. It would no longer be necessary to waste time on individual plants that are either past the flowering stage or a few days too immature—an almost impossible thing to determine rapidly while working in the field. Fungal infection, too, should be less than in artificially shed pollen. Also, the pollen can be relied upon to be perfectly matured, which is of immense importance to the medical research worker. The method, however, entails working in the field at such time as anthesis may take place.

III. Discussion of Anthesis, and Table.

No facts about anthesis in grasses in Africa have been published. The following discussion deals with some botanical facts of importance to students of allergy.

Description.—Each inflorescence in grasses consists of a number of flower units called spikelets. These do not all open in one day, but a few open on each of several occasions during as many days. When a spikelet opens, it does so rapidly ; and in the space of a few seconds the bracts open out, the plumed stigma spreads out and the two or three anthers are extruded and hang suspended on the end of the long filaments. The two sacs comprising each anther are closed at the time they are extruded, but open (by a terminal pore in each) soon after, and when there is a strong breeze blowing all the pollen is scattered in about ten seconds. The bracts close around the ovary soon after opening, and leave the stigma and anthers protruding until these drop off—within ten to thirty hours. Each anther, when full, contains many cubic millimetres of pollen, and on this fact depends the suggested method of collecting. If caught at the right time and in the right weather, a few spikelets on one inflorescence (the day's spikelets on every inflorescence open all at the same time) will yield about a quarter to half a salt-spoon of pollen when tapped gently three or four times.

Daily Rhythm.—Throughout the flowering period of every grass species, pollen is shed once in twenty-four hours. The same inflorescence will usually continue to shed pollen on successive days until all the spikelets on it have opened.

Each species sheds its pollen at its own time of day, and often with clock-like regularity. Examination of temperature and humidity charts shows that normally these factors both *rise* and *fall* once in twenty-four hours ; the relative humidity decreases as the temperature increases towards mid-day, and increases as the temperature falls towards a minimum about dawn. But grasses shed their pollen at all times of the day. Some do so at the first signs of a change in the morning, others at 10 a.m., at noon, in the late afternoon, at 8 p.m. and at 2.30 a.m. So there are no two classes into which the different species can be grouped according to their time of anthesis. The only basis of classifying the mechanisms of anthesis seems to lie in the possibility that some grasses require a maximum temperature and the rest require a maximum humidity. Some grasses shed pollen as the temperature is increasing (between 4 a.m. and 1 p.m.) and all others as the humidity is increasing (between 1 p.m. and 4 a.m.).

A knowledge of the physical factors responsible for operating this mechanism involved in anthesis would assist appreciably in the collection of pollen. Anthesis is probably controlled by some combination of temperature and humidity,* rather than any rhythm inherent in the plant. It is therefore understandable that there are variations of an hour and more in the time of anthesis in any one species on different days. *Hyparrhenia hirta* was observed to be shedding pollen at 9.30 p.m. on 11th February, but on the night of 23rd—24th February this species did not shed pollen until 2.15 a.m. Other examples could be given to illustrate this variation due apparently to irregularities in the daily rhythm in evaporating power of the air. Large quantities of pollen have been collected from *Andropogon amplectens* between 11.45 p.m. and 12.15 a.m. and yet the spikelets of this species have been observed to remain closed until 5.45 a.m., when the spikelets were watched as they opened. Again, rain during the time that anthesis usually takes place in *Monocymbium* may have been responsible for the complete lack of flowering that day, because a few days before and a few days after this the same patch of the grass was shedding much pollen. Insufficient work has been done as yet to permit of any more definite suggestions, but it does appear so far that the time of anthesis depends on the attainment of a somewhat exact evaporating power of the air. This exactness is shown by the repeated observation that all the grasses that open in the morning, for example, do not do so at the same hour. On a certain day, *Andropogon amplectens* was shedding pollen at 7.45 a.m., but *Cynodon* and *Pogonarthria falcata* not until about 8.30 a.m. and *Eragrostis gummiflua* not until about 8.45 a.m. The conditions necessary may be heralded or followed by a breeze, but the fact that on a perfectly calm afternoon *Monocymbium* was shedding pollen in a superlative manner belies the possibility that a breeze markedly influences anthesis. The possible importance of the gradient of the change in the above factors (*i.e.* the relation to minimums) rather than the actual temperature and humidity must be borne in mind.

Different individuals of the same species all shed their pollen within the same half-an-hour or less on any one day if in the same locality. (Precocious spikelets, which are uncommon and *extremely useful as*

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* Wind + Temperature + Humidity = Evaporating power of the air.

indicators, are excepted.) This, together with the fact already noted above about the day's spikelets on each inflorescence, is of importance in collecting. Remember, too, that the time taken from when the spikelet opens for the pollen to be dispersed depends entirely (after the first few seconds or minutes, as the case may be, required for the anthers to dehisce) on the wind, except on such occasions as the misty night on which the spikelets of *Andropogon amplectens* opened at 2 a.m., but the anthers did not open until about 6.30 that morning. (See Table I.)

Seasonal Rhythm.—The length of the flowering period of each species is about a month or two, excluding stragglers that are found as much as three months out of date. The exact date each year depends on the locality, and, in any one locality, on the lateness or earliness of the particular season (Altona, 1939) and the treatment that year; burning (Cook, 1939), grazing (Altona, 1940), fertilizing (Altona, 1940) and sowing or otherwise starting of germination in nature and farm practice each affect the time of flowering. Glover (1937) gives the seasonal phenology of most Highveld grasses.

The duration of the flowering-life of each plant depends on the number of inflorescences, that is whether an annual grass with a few stems or a tussock grass. A single inflorescence, however, flowers for from a few days (*e.g. Trachypogon* and *Harpechloa falx*) to a week or so (*e.g. Zea mays*). (See Table I.)

IV. Practical Details.

Most of the following points refer to a procedure that has been found to be quite suitable. The collector must observe the patch of grass chosen until anthesis begins, which usually happens very suddenly; and then the plants with open spikelets can be visited one by one as they come into flower.

Noted below for the sake of completeness are two suggested alternative methods of collecting.

1. The most suitable sizes of collecting bag seem to be flat envelopes about 6 inches long by 5 inches high, or 5 inches long by 9 inches high, or 12 by 12 inches when collecting from large bunches of inflorescences.

2. Cellophane-paper envelopes were used so that it could be seen when the pollen collected began caking due to the moisture absorbed. A sheet of paper twice the size of the envelope is cut and folded double, and the two edges are stuck with rubber solution and folded over again to give a clean edge inside. It may be better to use porous paper envelopes.

3. For the same reason that pollen often absorbs moisture from the

atmosphere, it was found to be impossible to collect pollen of *Zea mays* or *Trachypogon,* for example, without using a desiccator in the field. The packet is emptied into a watch-glass every minute or two. A portable desiccator is easily made from a wide-mouthed tin partially filled with Calcium chloride.

4. It is suggested that the planting of grasses in nursery plots may facilitate collecting. But the plants must not be too near together, because it is then difficult to work without wasting the pollen of many plants.

5. Pollen must not be stored without having been given prolonged desiccation. The desiccator may be a convenient storage place.

6. As an alternative method of collecting, it may be preferred to collect the anthers themselves after the spikelets have opened in the veld, but before the anther-sacs have dehisced.

7. Secondly, the flowering culms can be cut before anthesis sets in, and placed in water indoors in the usual way.

V. SUMMARY.

1. The process of anthesis in certain grasses in the veld near Johannesburg has been discussed, and details have been given of the time of day and time of year that some thirty grass species can be expected to flower. The reasons for variation are suggested.

2. All this is of value to medical research, in connection with both the incidence of certain allergic discomforts and its application to the collection of pollen for allergy tests.

3. A preliminary account of this successful method of collecting is given.

4. Naturally local conditions of climate will require study, region by region.

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I thank Professor John Phillips, in whose Department and with whose encouragement this work was accomplished.

REFERENCES.

ALTONA, R. E. (1939): "Growth Studies of Six Highveld Grasses." Hons. Thesis, University of the Witwatersrand.

—— (1939): "Growth Rhythm: A Growth Study of Six Highveld Grasses in Relation to Certain Environmental Factors." M.Sc. Thesis, University of the Witwatersrand.

COOK, LYNETTE (1939): "A Contribution to our Information on Grass Burning." S.A. Journ. Sci., Vol. XXXVI.

GLOVER, P. E. (1937): "A Contribution to the Ecology of the Highveld Flora." S.A. Journ. Sci., Vol. XXXIV.

WODEHOUSE, R. P. (1935): "Pollen Grains: Their structure, identification and significance in science and medicine." McGraw Hill, New York.

TABLE I.

Pollen-shedding in Highveld Grasses: Johannesburg—Germiston 1940—41.

SPECIES.	HABITAT(S).	TIME OF DAY.	FLOWERING PERIOD.	REMARKS.
Alloteropsis semialata.	Undisturbed veld.	Early morning before 8 a.m.	Jan. and Feb.	
Andropogon amplectens.	Disturbed and undisturbed veld.	10 p.m. to 6.15 a.m.	Jan. to March.	Spikelets sometimes open long before anther-sacs. Pollen collected before mid-night and after sunrise.
Andropogon schirensis.	Undisturbed veld.	6 a.m. to 7.30 a.m.	Jan. and Feb.	Not the same as *A. amplectens*, but some doubt as to time.
Cymbopogon excavatus.	Disturbed and rocky veld.	9.30 p.m. to 1 a.m.	Jan. and Feb.	
Cynodon dactylon.	Roads, ploughed lands and lawns.	5 a.m. to 7.30 a.m.	Dec. to end Feb.	Usually about 7 o'clock; much pollen is shed by the wind at 8 a.m.
Digitaria horizontalis.	Old roads and lands.	2.30 a.m. and probably earlier.	Jan. and Feb.	Apparently not much pollen produced.
Eleusine indica . .	Old roads and lands.	After sunrise before 7 a.m.	Feb. and Mar.(?)	
Eragrostis brizoides.	Undisturbed veld.	5 a.m. to 6 a.m.	End Nov. to Feb.	
Eragrostis c.f. *chloromelas.*	Old fallows and old roads.	8 p.m. to 10 p.m.	Dec. to end Feb.	
Eragrostis c.f. *curvula.*	do.	do.	Nov. to end Feb.	
Eragrostis gummiflua.	Disturbed and undisturbed veld.	7.30 a.m. to 8.30 a.m.	Jan to end Feb.	
Eragrostis plana	Old roads and along paths.	4.30 a.m. to 6.30 a.m.	Jan. and Feb.	Sometimes a little later on misty mornings.
Harpechloa falx	Undisturbed veld.	7 a.m. to 8 a.m.	Nov. to mid Dec.	Possibly earlier, too.

SPECIES.	HABITAT(S).	TIME OF DAY.	FLOWERING PERIOD.	REMARKS.
Hyparrhenia hirta	Old fallows and along roads and watercourses.	9 p.m. to 2.30 a.m.	Mid Nov. to Feb.	Usually sheds pollen a few hours before midnight, but often about dawn in misty weather.
Monocymbium ceresiiforme.	Undisturbed veld, especially moist patches.	5 p.m. to 6 p.m.	End Jan. to Mar.	Large amount of pollen produced; the weather (apparently) frequently prevents anthesis more than once every few days.
Panicum laevifolium.	Recent fallows.	6 a.m. to 7.30 a.m.	Jan. and Feb.	Abundant on farms and used as hay; also a weed in gardens.
Pogonarthria falcata.	Fallows and along paths.	2.30 a.m. to 8 a.m.	End Jan. to Mar.	A common weed on garden paths. Usually sheds pollen between 7 and 8 a.m.
Setaria sp. . .	Recent fallows.	5 a.m. to 6 a.m.	Jan. and Feb.	Occasional garden weed.
Sporobolus indicus,	Fallows and especially beside paths.	1.30 a.m. to 6 a.m.	Dec. to end Feb.	Usually sheds pollen about sunrise, and later if calm.
Trachypogon plumosus.	Exclusively undisturbed veld.	11 a.m. to 2.30 p.m.	End Jan. to Mar.	Anthesis usually at about noon; pollen shed very soon after spikelet has opened.
Urelytrum squarrosum.	Undisturbed veld.	Early morning before 8 a.m.	Jan to end Feb.	

APPENDIX: *Certain Grasses Introduced to the Highveld; observed Johannesburg—Germiston,* 1940—41.

Acroceros macrum	Grazing and hay.	About sunrise.	Jan. and Feb.	
Chloris gayana . .	Artificial pasture grass; exotic.	11.45 a.m. to 12.30 p.m.	Dec to end Feb.	Pollen shed very soon after anthesis, because anther-sacs open soon and it is usually windy.
Cynodon "Star-grasses."	Grazing and erosion works.	do.	Dec. to Feb.	Introduced from Kenya.

Species.	Habitat(s).	Time of Day.	Flowering Period.	Remarks.
Panicum deustum.	Ensilage and hay.	do.	Jan. and Feb.	
Panicum maximum.	Ensilage and hay.	do.	do.	
Setaria spp. ..	Ensilage and hay.	do.	Dec. to Feb.	Introduced from Tropical Africa.
Urochloa sp. ..	Grazing and hay.	do.	Jan. and Feb.	Introduced from the Bushveld.
Zea mays ..	Crop plant (maize); exotic.	8 a.m. to 3.30 p.m.	Dec. to Mar.	Unusual behaviour, because although majority of pollen is shed between 12 and 2.30 very many anthers open as early as 8 a.m. and as late as 3.30 p.m. on the same day.

Notes :—(i) The times given refer to the opening of the anther-sacs (by the apical pores) and not to the opening of the spikelet or the extrusion of the anthers.

(ii) Time of opening of the anther-sacs has not been confused with the time at which the pollen is dispersed ; the latter may be as much as a few hours after the former on calm days. Observations were made before and after anthesis, or on windy days, or of the whole process as anthesis took place.

(iii) The range of time given for each species indicates the limits within which the half-hour or so required for anthesis can be expected to fall on different days. The period suggested is based on about five observations in most cases, but is still no more than an approximation. It does not include such obvious irregularities as the occasion on which *Cymbopogon excavatus* shed a maximum quantity of pollen between 5 and 5.30 in the afternoon ; these variations are infrequent.

(iv) The time at which the pollen is usually shed by the wind, rather than the time of anther-sac opening given in the table, is of importance in studying the incidence of Hay-fever and Asthma. Such incidence depends not only on the time and amount of anthesis, but on the daily distribution of winds. At the Botanical Research Station, Frankenwald, where the work was done, there is a light breeze that does not last long just before dawn, another just after eight in the morning and very often at about mid-day, at 7 p.m. and at about midnight. Pollen therefore is most commonly shed at these times ; for example, in all the species in which anthesis takes place between dawn and 8 a.m. the pollen is usually shed by the wind at about 8 a.m., because it is usually calm previous to this hour of the day. Grass pollen is comparatively light (Wodehouse, p. 307), but some of the species examined seem in the veld to have heavier pollen that sinks to the ground a few yards from the plant ; *Zea mays* is an example of the latter.

(v) *Especially in towns, where there is always weeding and mowing,* many grasses continue flowering much later into the season than shown in the table.

SOME NOTES ON *OXALIS CRISPULA* SOND. AND *OXALIS STENOPTERA* TURCZ., WITH DESCRIPTIONS OF NEW VARIETIES OF THESE SPECIES.

By Paymaster Captain T. M. Salter, R.N. (Ret.).

Among the less known Oxalis included in the Flora Capensis, Vol. I, are the species *O. crispula* Sond. (23) and *O. stenoptera* Turcz. (*O. glaucovirens* Sond.) (62). Although these two species are in no way related to one another, it is a curious coincidence that a variety of the latter, *O. stenoptera*, var. *undulata* Salter, var. nov., which is here described, is superficially very similar in appearance to *O. crispula*, both plants having yellow flowers and oblong crinkled leaflets. This variety is exemplified by the specimen *Schlechter* 8197, Karee Berge, which is probably in many herbaria under the name *O. crispula*.

Some new varieties of these two species are described in the following paper and since the existing descriptions* of the typical forms were made from Zeyher's poor specimens and omitting as they do nearly all the characters which show their true affinities, revised and more complete analyses are now given, together with some notes on their real affinities.

I. O. crispula Sond.

O. crispula is closely related to the large and variable group of plants with oblong or rotund leaflets, many of which were figured by Jacquin, and which Sonder brought together under one species, renaming it *O. mutabilis* Sond. I am inclined to agree with him in this amalgamation, especially after finding a number of other variants and intermediates, but the name *mutabilis* is illegitimate by modern rules and it is proposed to revert to the name *O. ambigua* Jacq. for this species.

O. crispula is perhaps little more than a variety of *O. mutabilis*, but since it is so readily distinguished by its crinkled leaflets and has itself a distinct variety, it is considered most convenient to retain it in its specific rank.

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* In Pflanzenreich, Oxalidaceae (1930), R. Knuth, who does not appear to have seen either of the *types*, merely copies the existing errors in the case of *O. stenoptera*, while in the case of *O. crispula* his description evidently applies in part to the specimen *Schlechter* 8197, referred to above, which is not *O. crispula* at all.

It should be noted that the sub-section Tripartitae, sub-series Oblongae in this work is quite artificial and many of the species therein are closely related to or are even varieties of those in the sub-section Rotundatae.

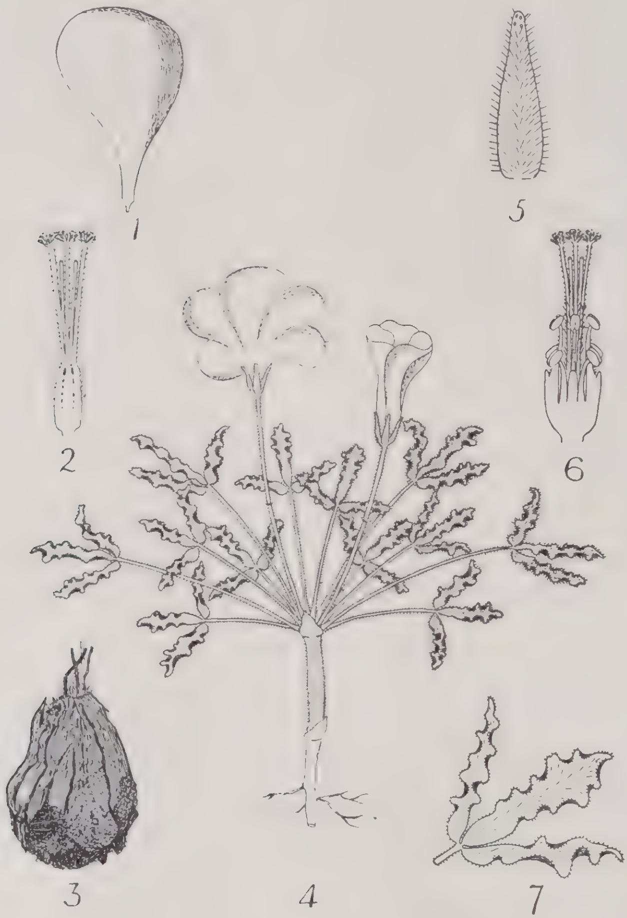

Fig. 1. *Oxalis crispula* Sond. 1. Petal × 1½. 2. Gynaecium × 6. 3. Bulb natural size. 4. Plant, natural size. 5. Sepal × 5. 6. Androecium × 6. 7. Leaf of *O. crispula* var. *glandulosa* Salter × 2. (Salter 932 A). *Del.* T. M. Salter.

O. crispula Sond., emend. Salter. Rather densely hairy with simple hairs, usually with an exerted stem. *Bulb* ovoid or oblong-ovoid, often 2—3 cm. long, the blackish gummy tunics pubescent with rufous hairs at the apex. *Stem* erect, stout, leafless, usually 2—4 cm. long, with 1 or 2 semi amplexicaul scales. *Leaves* fairly numerous, terminally congested, spreading, with hirsute petioles up to 3 cm. long : leaflets 3, sessile, cuneate-oblong, entire at the apex, conspicuously undulate at the margins, 1—1·5 cm. long, pilose on *both* sides, green or brown, often black-dotted. *Peduncles* terminal, 1-flowered, 2—4 cm. long, hirsute, with 2 small opposite bracts set at the upper articulation near the middle. *Sepals* lanceolate, 4·5—5·5 mm. long, hirsute, inconspicuously callose at the apex. *Corolla* 1·5—2 cm. long, glabrous, rather pale yellow, with a broadly funnel-shaped tube : petals 8—12 mm. broad, the obliquely obovate limb twice as long as the claw, with a broad band of minute purple dots and streaks along the outer margin. *Filaments* (connate part included), the longer 3·5—6·5 mm. long, minutely glandular, with short teeth. *Ovary* pubescent and callose on the upper half, the chambers about 9-ovuled. *Styles* pubescent below, glandular above (Fig. 1).

Hab. Cape Province : Van Rhyn's Dorp Div., between Bitterfontein and Eenkoker, *Zey.* 230, *type*, Bitterfontein, *Salter* 932A. Flowers May—June.

There are two distinct forms which grow in association, some plants having green leaves and others brown. These have retained their distinctive leaf colours in cultivation.

Var. β **glandulosa** Salter, var. nov. *Folia* brunnea : foliola supra leviter pubescens, infra glabra, margine pilis brevibus capitatis ciliata. *Partes herbaceae* pilis capitatis satis dense pilosae.

Hab. Cape Province : Van Rhyn's Dorp Div., Bitterfontein, *Salter* 932B (*type* in Bolus Herbarium).

Leaves brown : leaflets thinly pubescent above, glabrous below, ciliate with capitate hairs, densely clothed with capitate hairs on all the other herbaceous parts.

II. O. STENOPTERA Turcz.

O. stenoptera Turcz. (an earlier name than *O. glauco-virens* Sond. in the Flora Capensis) differs from the *ambigua* group in many respects. The hairs are pluricellular and rather thicker and the peduncles are without an upper articulation, the bracts being long, alternate and partly embracing the calyx. The bulb is quite different and as will be seen from the full descriptions, there are different floral characters. The petioles are somewhat flattened but by no means winged, though when dried and pressed they may appear to be so. The name is therefore not appropriate.

Sonder's description of the hairs in *Zey.* 239 (of which I have examined three sets) is quite inaccurate, for all the hairs are pluricellular and none glandular. The glaucous colour of the upper surface of the leaflets is only observable in dried specimens and even then is not constant. I cannot understand how Sonder came to liken the leaves to those of *O. tenella* Jacq., for they do not resemble them in the least.

O. stenoptera Turcz. emend. Salter (*O. glauco-virens* Sond.). Rather robust, 4—10 cm. high, the stem not exserted, the herbaceous parts more or less clothed with pluricellular hairs. *Bulb* with a contractile root (mature), ovoid-conical, acute at the apex, up to 5 cm. long, with vertically nerved splitting brown tunics, the younger elongate, narrowly lanceolate in outline with a slender apical beak and pale brown shining crinkled tunics. *Rhizome* 30 cm. or more long. *Leaves* basal, often 8—15 : petioles usually 2—4 cm. long, slightly flattened, pilose : leaflets 3, sessile, broadly obcordate, widely cuneate at the base, the medial 0·6—1·5 cm. long, the lateral oblique, always rather smaller, glabrescent above, sometimes sparsely pilose below, closely ciliate, often punctate with small brownish calli. *Peduncles* numerous, 1-flowered, 2—2·5 cm. long, pilose, with 2 long alternate linear bracts usually partially embracing the calyx. *Sepals* broadly lanceolate, 5—7 mm. long, densely ciliate. *Corolla* 1·5—2·5 cm. long, yellow, with a rather widely funnel-shaped tube : petals broadly cuneate, rotund or obliquely truncate at the apex, slightly attenuate into a short claw at the base. *Filaments* (connate part included) the shorter 2—5 mm., the longer 4—7 mm. long, glandular, rather broadly toothed, the longest recurved at the apex. *Ovary* glandular-pilose, ecallose, the chambers 2-ovuled.

Hab. Cape Province : Van Rhyn's Dorp Div., between Eenkoker and Bitterfontein, *Zey.* 239 (type in Herb. Sond.), *Zey.* 242 *ex parte* (in S. A. Museum) ; Bitterfontein district, *Salter* 922A, 5349, 6638.

This species is a very close affinity of *O. aurea* Schlechter, a plant which is abundant in the Clanwilliam district and which has an exactly similar root system. I retain the latter as a species on the following differences. Petioles not flattened ; petals almost cuneate ; longest filaments not recurved at the apex ; ovary with rows of small orange-coloured calli between the chambers on the upper half. *O. aurea* is extremely variable in its degree of hairiness, specimens from about Citrusdal usually having entirely glabrous leaves. I consider *O. Maderi* Bolus f. to be merely an etiolated form of *O. aurea*, with oval-oblong leaflets. *O. Louisae* Salter though quite distinct, is also affiliated to the same section.

The bulbs in *O. stenoptera* and its varieties are all similar and have contractile roots, the mature flowering bulbs lying at a great depth.

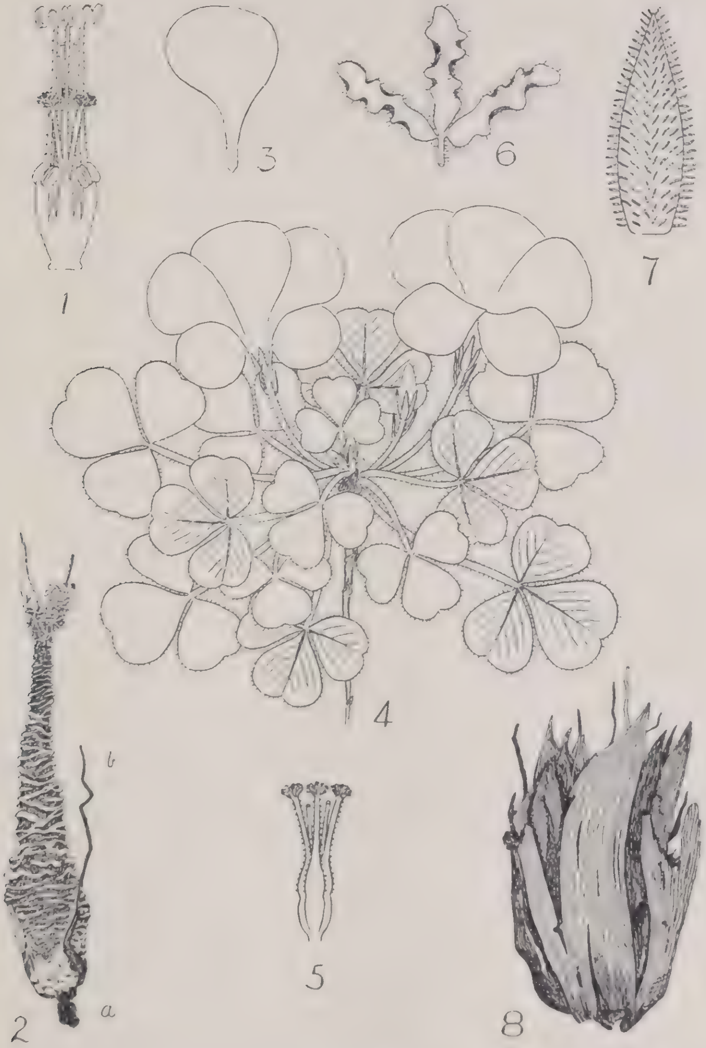

FIG. 2. *Oxalis stenoptera* Turcz., var. *alba* Salter. 1. Androecium × 6. 2. A young bulb, showing (*a*) the shrivelled remains of the contractile root at the base and (*b*) the previous year's intercalary elongation of the rhizome on which the bulb was formed, natural size. 3 and 4. Petal and plant, natural size. 5. Gynaecium × 6. 6. Leaf of var. *undulata* × 2. 7. Sepal × 6. 8. A mature bulb, natural size (*Salter* 1588). Del. T. M. Salter.

The lower part of the rhizome is thread-like and easily broken and the bulbs are consequently very difficult to obtain. They grow in hard soil and long and patient work with a crowbar is necessary.

Var. β **alba** Salter, var. nov. *Partes herbaceae* pilis pluricellularibus et capitatis pilosae. *Caulis* non exsertus vel in umbrosis valde exsertus efoliatus. *Corolla* alba, tubo luteo, angustiore (Fig. 2).

Hab. Van Rhyn's Dorp Div., Bitterfontein district, *Salter* 950 (*type* in Bolus Herbarium), 945, 1588, 2512, 2515, 5335, 6637 : Namaqualand. Khamieskroon, 1538.

Corolla white with a rather narrower yellow tube : petals with a narrow claw. Sometimes producing a leafless stem in shady situations.

Frequently found in seasonal stream beds and, under favourable conditions, larger in all parts than the typical form, the leaves in luxuriant specimens sometimes cuneate-obovate.

Var. γ **undulata** Salter, var. nov. *Caulis* non exsertus, vel in umbrosis valde exsertus, robustus, efoliatus. *Folia* numerosissima : foliola oblonga, ad apicem conduplicativo-falcata, margine valde undulata, supra glabra, epunctata. *Corolla* flava, 2—3 cm. longa, tubo concolore late infundibuliforme.

Hab. Van Rhyn's Dorp Div., Nieuwerust district, *Salter* 5339 (*type* in Bolus Herbarium), 2514, 4614, 5342 : Karee Berge, *Schlechter* 8197 (distributed as *O. crispula* Sond.).

Stem not exserted, or in shade well exserted, robust and leafless. Leaves very numerous : leaflets oblong, conduplicate-falcate towards the apex, the margins undulate, glabrous above, undotted. Corolla yellow, 2—3 cm. long, with a rather wide tube.

This plant bears a remarkable superficial resemblance to *O. crispula* Sond., from which it is distinguished by its bulb, pluricellular hairs, more numerous leaves, long bracts, usually embracing the corolla, larger flowers, recurved longer filaments and 2-ovuled ovary chambers.

A NEW VARIETY OF *OXALIS IMBRICATA* E. & Z. WITH NOTES ON THE CONFUSION BETWEEN *O. IMBRICATA* AND *O. ZEEKOEVLEYENSIS* R. KNUTH.

By Paymaster-Captain T. M. Salter, R.N. (Ret.).

O. imbricata E. & Z., var. **cuneifolia** Salter, var. nov. A forma typica differt :—*Planta* valde caespitosa. *Caulis* semper exsertus. 2—4 cm. longus, dense pilosus. *Foliolum* medianum cuneatum, ad 1 cm. longum, 0·9 cm. latum, utrinque pilosum, apice conspicue incisum, lateralia obliqua, minora. *Filamenta* longiora brevissime dentata. *Corollae* tubus angustior, in faucibus saturate purpureus : petala cuneata, lamina roseo-purpurea. Fig. 1.

Hab. Cape Province : Riversdale—Mossel Bay Divs., near Gouritz River Bridge, *Pillans* 6654 (*type* in Bolus Herbarium), *Salter* 2378.

This well-marked variety has only been observed in the locality given. It differs from the typical form in always having an exserted stem, in its longer leaflets, the medial being cuneate and conspicuously incised at the apex, in the very shortly toothed filaments and in the narrower petals and purplish eye in the throat of the corolla tube. The shapes of the leaf and petal of the typical form are shown in Fig. 1, 7 and 8 and the tooth on the filament at 6*b*.

The imbrication or massing of the bulbs, which apparently suggested the trivial name *imbricata*, is particularly pronounced in the case of var. *cuneifolia*. The system of increase in the bulbs is shown in Fig. 1, 2. Two or three new bulbs (*b*, *b*) commence to form in the exhausted current year's bulb (*a*) and are dragged down on the intercalary prolongation of the rhizome (*e*) by the soft fleshy contractile root (*c*), which also acts as a water storage organ. The old, or previous year's intercalary growth (*f*) often persists, becoming tough and wiry. The result is that eventually a dense tuft of plants is formed and the tangled interwoven mass of bulbs is difficult to separate. Bulbils are very rarely produced on the rhizome *above* the bulb in this species.

O. imbricata and its variety *violacea* R. Knuth have not hitherto been fully or accurately described and Sonder confused the variety with another species, superficially very much like it, which has since been named *O. zeekoevleyensis* R. Knuth. The latter species is common in

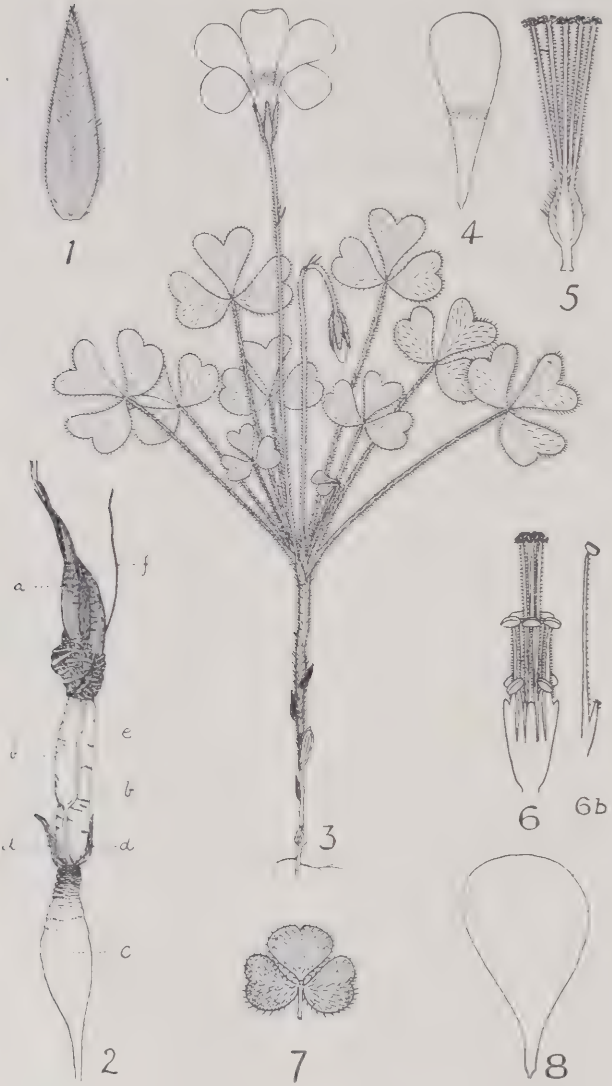

FIG. 1. *O. imbricata* E. & Z., var. *cuneifolia* Salter. 1. Sepal × 5. 2. Bulb natural size: (*a*) current year's bulb, (*b,b*) new bulbs forming, (*c*) contractile root, (*d,d*) exhausted nutritive scales, (*e*) intercalary prolongation of the rhizome, (*f*) ditto, dead and persisting from the previous year. 3. Plant, natural size. 4. Petal × 1½. 5. Gynaecium × 5. 6. Androecium, 6*b* long filament of typical *O. imbricata* × 5. 7. Leaf of *O. imbricata* var. *violacea*, natural size. 8. Petal of same × 1½. (*Pillans* 6654). *Del.* T. M. Salter.

Caledon Division and extends to Bredasdorp Div., whereas *O. imbricata* has a more eastern distribution.

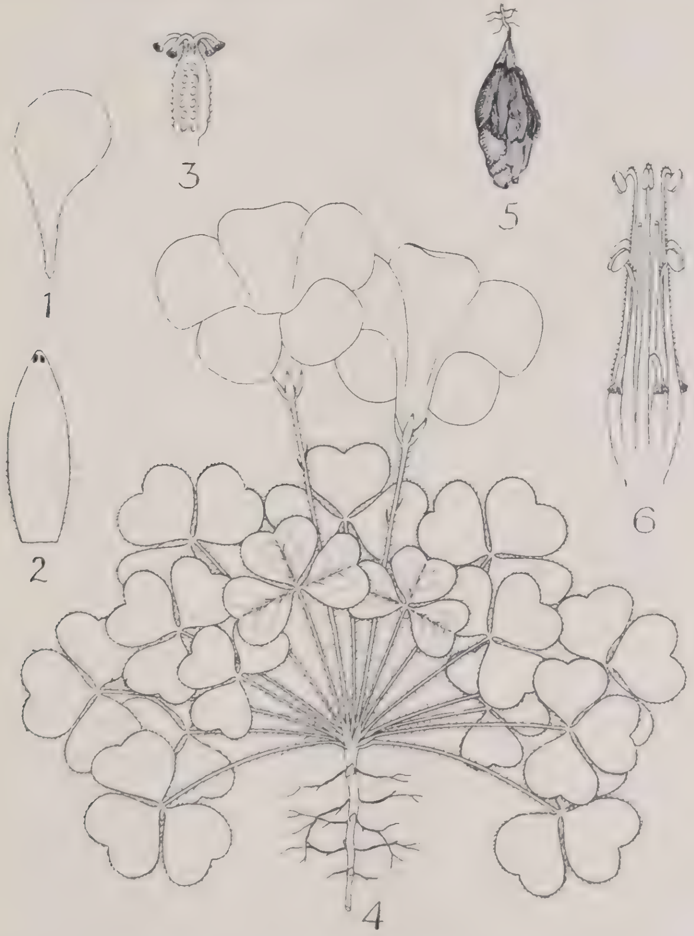

FIG. 2. *O. zeekoevleyensis* R. Knuth. 1. Petal, natural size. 2. Sepal × 6. 3. Gynaecium × 6. 4. Plant, natural size. 5. Bulb, natural size. 6. Androecium × 6. (*Salter* 1225.) *Del.* T. M. Salter.

O. zeekoevleyensis is exemplified by *Zey.* 2110, which is from Hartebeestrivier, Caledon, a specimen cited by Sonder as *O. imbricata* (typica), and there seems to have been some confusion of Zeyher's specimens, for

Zey. 2126 (the *type* of *O. imbricata*, var. *violacea*) is from Bushman's River, about 50 miles north-east of Uitenhage and not from Caledon as stated by Sonder. This error has evidently led to the belief that the Caledon plant (*O. zeekoevleyensis*) was *O. imbricata*, var. *violacea.*

O. imbricata, var. *violacea*, is exceedingly variable, with many local forms, some of which have a few glandular hairs. *O. riversdalensis* R. Knuth is identical with it and *O. georgica* Bolus f., though it has smaller flowers and rather less hairy leaves, merges into the other forms. *O. aganophila* Sond., in which Zeyher's specimens (*Zey.* 2127 ! in Herb. Sond.) appear to be etiolated, seems to be no more than a variety with pluricellular and glandular hairs and it is very much like *O. viscidula* Schlechter, a species which has unaccountably been sunk under *O. goniorhiza* E. & Z., (sub-series Lineares) by R. Knuth in Pflanzenreich. *O. aganophila* has been placed in the wrong section (Incarnatae) for, in spite of Sonder's assertion, it is not related to and not in the least like *O. incarnata* L.

The *type* of *O. zeekoevleyensis* (Schlechter 10548) is from near a not widely known farm, bearing the often recurring name of Zeekoevlei, about 10 miles south of Bredasdorp, a fact which came to light through studying Schlechter's itinerary. It was evidently dwarfed and flowering out of season and the salient characters which distinguish it from *O. imbricata* var. *violacea* are not given in its description.

The main differences between these two species are given in the following table :—

	O. imbricata E. & Z. var. *violacea.*	*O. zeekoevleyensis* R. Knuth.
Hairs.	Dense.	Sparse.
Bulb.	Elongate, lanceolate in outline.	Ovoid.
Tunics. ..	Wrinkled at base.	Smooth.
Bracts. ..	Opposite, set at an articulation on the peduncle.	Alternate.
Corolla. ..	Rosy-purple, with a darker throat.	Rosy-purple or lilaceous.
Longest filaments.	Not recurved at apex, teeth nearly 1 mm. long.	Recurved at apex, edentate.
Ovary chambers.	About 6-ovuled.	About 12-ovuled.

SOME NOTES ON *OXALIS PULCHELLA* JACQ. AND ITS VARIETIES.

By Paymaster-Captain T. M. Salter, R.N. (Ret.).

The species *Oxalis pulchella* Jacq. consists of a highly polymorphic group of plants, all of which may be recognised by the following common characters. Bulb large, elongate, usually obclavate, blackish and gummy or sometimes forming a hard shapeless mass when growing in rock crevices. Stem not exserted. Hairs thick, hyaline, shining. Leaflets thick and fleshy in texture, conspicuously pitted on both sides when dried owing to the collapse of the exceptionally large epidermal cells. Peduncles short, bibracteate below the middle. Sepals rather short, with 2 or more apical calli. Corolla white, pale yellow or pale salmon. Filaments edentate. Ovary chambers many-ovuled. The hairs on the nerves on the *upper* surface of the leaflets (an unique character) are only found in the typical form.

The following, which are not considered sufficiently distinct to be considered separate species, are here relegated to varieties or synonyms of *O. pulchella* :—

O. beneprotecta (Dinter) ex R. Knuth.
O. Edwardsiae Bolus f.
O. leucotricha Turcz. (*O. albida* Sond.).
O. marginata Jacq.
O. setifera R. Knuth.
O. sulphurea Jacq.

Many of the forms are fairly common, but all, with the exception of var. *tomentosa* (q.v.) which has a wide distribution, appear to be confined to Namaqualand. They usually flower in May and June.

O. foveolata Turcz. (*O. calligera* Sond.) from Kammas, Namaqualand, not Bechuanaland, is closely related to *O. pulchella*, but is sufficiently distinct to retain specific rank (see notes under *O. pulchella* var. *beneprotecta*). Sonder's description is, however, misleading, for the leaflets of Zey. 238 (*type* in Herb. Sond.) cannot possibly be described as *tomentose* and the limb of the petals is yellow, not rosy.

O. PULCHELLA Jacq. (*O. sulphurea* Jacq.—*O. marginata* Jacq.).
Hab. Namaqualand ; *Jacquin*, Darter's Grave, *Salter* 3707.

Oxalis pulchella Jacq., *O. sulphurea* Jacq. and *O. marginata* Jacq. are figured in Jacquin's Oxalis Monographia, tabs. 69, 63 and 68 respectively. All three are evidently the same species and the two latter have been correctly treated as synonyms by Sonder in Flora Capensis. No *exact* match of either of these plants has come to light since the time of Jacquin, but specimens collected at Darter's Grave in Namaqualand, 18 miles north of Garies (*Salter* 3707) with pale salmon-rose flowers, differ very slightly and have similar hairs on the nerves on the upper surface of the leaflets (see Fig. 1. f. 6). Dr. K. Keissler, who kindly compared my specimens with the *type* of *O. pulchella*, preserved in Vienna, informed me that they only differed in being rather more hairy. Neither this difference nor the colour of the flowers is of much importance and I therefore place this plant with the typical *O. pulchella*. My specimens had not the vivid red colouring on the under surface of the leaflets, depicted by Jacquin, but the leaflets of some of the varieties sometimes show this character in the living state, though not to such a pronounced degree.

Var. β TOMENTOSA Sond. (*O. Edwardsiae* Bolus f.). Leaflets rotund, greenish, usually glabrous above, with numerous minute calli along the margin, the medial usually as broad or broader than long. Corolla pale rose or salmon-rose, the lamina of the petal proportionally longer and broader than in the typical form.

Hab. Cape Province : Malmesbury Div. ; Grootepost (*O. pulchella* E. & Z. 711 *type*), Kalabas Kraal, *F. Bolus* (Bol. Herb. 14555) : Piquetberg Div. ; Monte Cristo, near Porterville, *Edwards* 73 (*O. Edwardsiae* Bolus f.), Grey's Pass, *Leipoldt* (Bolus Herb. 19704, 19705), *Salter* 747, 1684, 4428 : Van Rhyn's Dorp Div. ; between Olifant's River and Knakisberg, *Zeyher**, Bitterfontein, *Salter* 925, 5350 : Worcester Div. : near De Doorns, *Salter* 2184, 6041 ; Swellendam Div. ; *L. Bolus* (Bol. Herb. 20115).

E. & Z 711 is correctly placed here and is the same as Zeyher's specimens from between Olifant's River and Knakisberg, but Zeyher's other specimens from between Hartebeeste River and Eenkoker differ and are now placed in the next variety *glauca*. Again I cannot agree with Sonder that the leaflets are tomentose though the hairs overlying the collapsed cells give them that appearance at a casual glance.

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* Zeyher's numbers 228 and 240 are omitted both here and under the next variety. These numbers seem to have been erroneously interchanged by Sonder in the Flor. Cap. In Sonder's herbarium and in the South African Museum the tickets "from between Hartebeeste River and Eenkoker" bear the number Z. 240 in Zeyher's handwriting (not 228) and those "from between Olifant's River and Knakisberg" only have Zeyher's collecting number 58.

Possibly Zeyher's specimens have been confused in distribution and it is at any rate safest to cite them by their localities and not by their numbers.

Sonder has made the same error in the description of the leaves of *O. algoensis* E. & Z. and *O. collina* E. & Z.

Var. γ **glauca** Salter, var. nov. (*O. setifera* R. Knuth). *Pili* densiores. *Folia* 6—20, glauca : foliola utrinque aequaliter pilosa vel subtus glabrescentia, apice interdum inconspicue callosa, medium plus minusve rotundatum vel late cuneatum vel subrhombiforme, lateralia angustiora, oblique oblonga vel obovata. Corolla alba vel pallide lutea : petala apice subtruncata.

Plant more densely hairy. Leaves about 6—20, glaucous-grey : petioles up to 3 cm. long : leaflets evenly pilose or glabrescent above, rarely purple-mottled, sometimes with a few inconspicuous calli at the apex, the medial more or less rotund, broadly cuneate or subrhomboid, 0·7—2 cm. long, 0·7—1·8 cm. broad, the lateral smaller, narrower, obliquely oblong or obovate. Corolla 2—3 cm. long, pale yellow or white with a yellow tube, the lamina of the petals 0·9—1·5 cm. broad, somewhat truncate at the apex.

Hab. Namaqualand : between Hartebeeste River and Eenkoker, *Zeyher* ; Garies area, Salter 2530, 2555, 3398, 6650, 6659, 6671 ; Kamieskroon area, *L. Bolus* (Bol. Herb. 19988), *Salter* 803A, 806, 847, 850 (*type* in Bolus Herbarium), 870A, 1406A, 2568, 4600, 4613 ; Springbok area, *Salter* 908, 2579 ; Steinkopf area, *Salter* 5548, 5551.*

O. setifera R. Knuth, described from a fragment without flowers, is this variety.

Var. δ **leucotricha** (Turcz.) Salter, comb. nov. (*O. leucotricha* Turcz.—*O. albida* Sond.). Stem not exserted. Herbaceous parts hirsute with thick shining hyaline patent hairs. Bulb elongate, obclavate, up to 12 cm. long with dark brown gummy tunics : root contractile. Leaves often 10—15, spreading : petioles 1—2·5 cm. long, densely hirsute : leaflets 3, sessile, oblong or ligulate, tapering slightly towards the base and apex, obtuse, sparsely hirsute above and on the conspicuous medial nerve below, ciliate, hollow-dotted on both sides when dried, the medial up to 4·5 cm. long and 0·7 cm. broad, the lateral slightly oblique, usually rather smaller, the leaflets of the young bulbils more or less rotund, lengthening progressively. Peduncle up to 3 cm. long, densely hirsute, with 2 alternate linear bracts, 3—4 mm. long, callose at the apex, situated below the middle. Sepals oblong, obtuse, about 5 mm. long, densely ciliate, conspicuously bicallose at the apex. Corolla glabrous, 2—3 cm. long, pale yellowish-salmon : tube yellow. Filaments (connate part included), longer 4·5—8 mm., sparsely glandular-pilose, edentate, shorter 2·5—4 mm. long, glabrous. Ovary glandular-pilose on the upper half with

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* Some of my earlier specimens of this variety were distributed under the manuscript name *O. rupicola*.

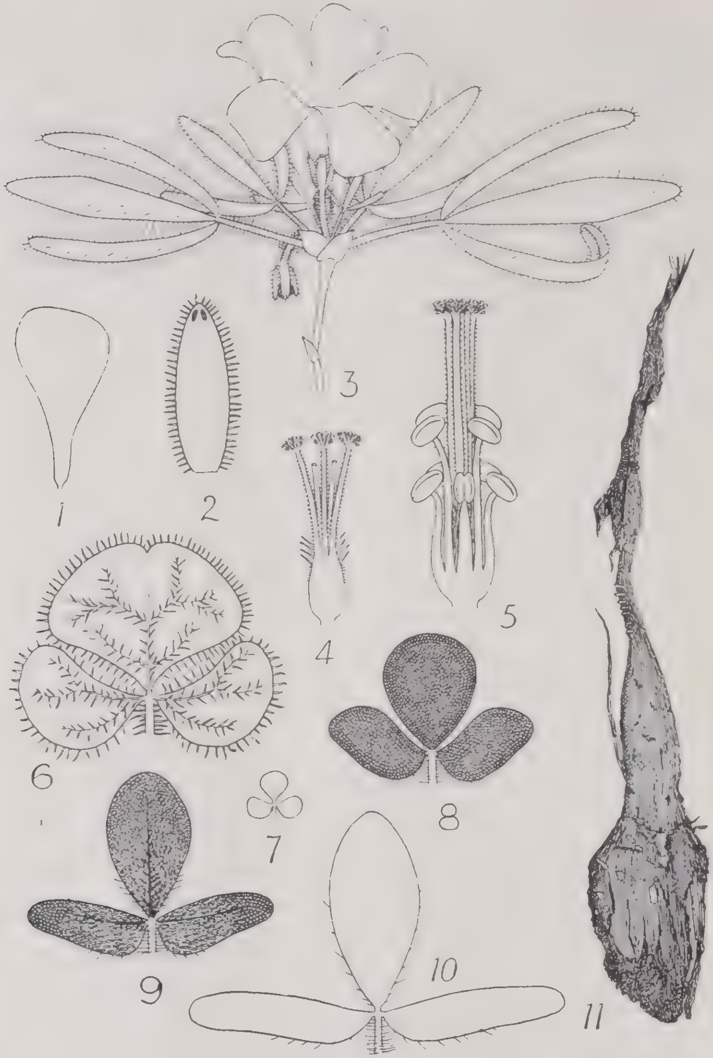

Fig. 1. *Oxalis pulchella* Jacq., var. *leucotricha* (Turcz.) Salter. 1. Petal, natural size. 2. Sepal × 5. 3. Plant, natural size. 4. Gynaecium × 6. 5. Androecium × 6. 6. Leaf of *O. pulchella*, upper side. 7, 8, 9 and 10. Leaves of var. *leucotricha* showing progressive lengthening of the leaflets (8, upper side and 9, under side of dried leaves, showing the pitting due to the collapse of the cells), all × 2. 11. Bulb, natural size (*Salter* 6651). *Del.* T. M. Salter.

a few long hyaline hairs near the apex, the chambers about 10-ovuled. Styles glandular-pilose.

Hab. Namaqualand: between Hartebeeste River and Eenkoker, *Zey.* 228 (*ex parte*), 6½ miles west of Garies, *Salter* 6651.

O. leucotricha Turcz. is no more than a variety of *O. pulchella.* Since normal plants can scarcely be recognised from the existing description of Zeyher's poor starved specimens, a full and revised description, with figure (Fig. 1) is given above under the varietal name *leucotricha.* This variety, which had escaped rediscovery since Zeyher's time, has pale yellowish-salmon flowers and I think it very doubtful whether the flowers of the *type* (*Zey.* 228) were yellow as stated by Sonder: at any rate they are now colourless. It was found in abundance along the Hondeklip road near Garies in Namaqualand and, about 100 yards away, separated from it by a small valley, a form with more or less rotund leaflets, but otherwise identical (*Salter* 6650), was just as abundant. This latter form is inseparable from the preceding variety *glauca.* The two forms were not found in actual association and there were no intermediates.

Var. *leucotricha* has been grown in cultivation in the National Botanic Gardens at Kirstenbosch and it has been found that the young bulbils at first produce rotund leaflets, the later leaflets becoming progressively longer as shown in Fig. 1, f. 7, 8, 9 and 10.*

Var. ε **beneprotecta** (R. Knuth) Salter, comb. nov. Plant smaller in all parts, the hairs thinner. Leaves rosulate, spreading, often very numerous (up to 200) and forming dense flat tufts: leaflets glaucous-grey, almost glabrous, the medial cuneate, rotundate at the apex or cuneate-rhomboid, 3—8 mm. long, the lateral obliquely oblong or oblong-obovate, smaller and narrower: petioles usually pilose, the lower up to 4 cm. long, the upper progressively shorter. Peduncles 2—6 mm. long rarely up to 1·2 cm. long. Sepals ovate, 3—4 mm. long. Corolla about 2 cm. long, pale yellow, with a rather broadly funnel-shaped tube: lamina of petal obliquely obovate, longer than the claw, minutely purple-streaked on the outer margin. Longest styles or stamens 7 mm. long.

Hab. South-West Africa; Vahldorn, *Dinter* 5182 (*type*): Namaqualand; Louwpoort, *Salter* 4590, near Kamieskroon, 1407, 9 miles north of O'Okiep, 2585.

Dinter's specimens are less hairy and have far fewer leaves than those from Louwpoort and Kamieskroon which were growing in rock crevices and had large distorted bulbs, but the two forms are evidently not separable.

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* A similar progressive lengthening of the leaflets also takes place in other species, *e.g.*, *O. laburnifolia* Jacq., var. *angustata* and *O. Framesii* L. Bolus.

This variety resembles *O. foveolata* Turcz. (*O. calligera* Sond.), differing in its wider, funnel-shaped corolla tube and much shorter styles and stamens. The tube in *O. foveolata* is nearly cylindrical and the longest styles and stamens 1·4 cm. long and well exserted from the tube.

Var. *glabrata* Sond., Langvallei, *Drege* !, in Herb. Sond. is *O. luteola* Jacq. The leaves appear to have been diseased.

NOTES ON *ALOE LINEARIFOLIA* BERGER.

By G. W. Reynolds.

(With Plate XIII.)

The purpose of this paper is to establish the identity of *Aloe linearifolia* Berger, to amplify the description, and to illustrate this little-known species for the first time.

Berger (in *Engl. Jahrb.* LVII, 640, 1922) describes the species as follows (from the Latin) :—

> *Stemless* or with short stem. *Leaves* few, about 6 sub-distichous, linear, 15—35 cm. long, 8—10 mm. broad, narrowed a little towards apex, obtuse, thin, not keeled, with narrow cartilaginous toothless margin. *Peduncle* 25—30 cm. high, nude at base, armed upwards with several scarious 3—5 nerved ovate-deltoid sterile bracts about 12 mm. long. *Racemes* abbreviated, congested, about 15—20 flowered. *Pedicels* 15—20 mm. long, about twice as long as the bracts, thickened above. *Perianth* 12—14 mm. long, yellow. *Segments* shortly connate at base, a little recurved at apex. *Style* at length exserted.
>
> Natal : Fairfield, Moyeni, in sunny sparsely turfed stony ground slopes at 700 met.
>
> " Flowers yellow " (Rudatis 1643, fl. 19 March 1912.—Herb. Dahl.).

Berger also has a note " Differs from allied species of *Aloe* in the Section *Leptoaloe* with leaves without teeth and keel."

The identity of this *Aloe* has puzzled me for some years, and there has been the keen desire to clear it up. I could find no trace of any town or locality with the names Fairfield and Moyeni, but eventually ascertained that these were the names of two adjoining farms about four miles westwards of Dumisa, South Natal. I made a special journey there in March, 1939, and searched likely-looking places, but in vain.

Recently Mr. E. Schelpe, Jun., of Durban, sent some material to me for identification, and to my great joy I recognised the long-sought-for *A. linearifolia*. Mr. Schelpe also kindly disclosed the precise locality where he had collected the plants near Margate, South Coast, Natal, and I was fortunately able to make a special journey there on 23rd February, 1941. I found several hundred plants, some still in flower, but mostly flowers over or in fruit. Plants were solitary, scattered over a few acres of short grass veld in blackish sandy soil, about half a mile from the sea, and facing the sea.

In my opinion, those plants definitely belong to *A. linearifolia*. A few plants were found which exactly fitted Berger's description in the characters " leaves without teeth and keel ", but these characters are by no means fixed. In most of the plants examined, the leaf margins were armed with small to minute teeth in lower quarter, the teeth obsolete upwards. An occasional specimen bore leaves with a very obtuse, very slight keel, while a few of the largest plants had leaves spirally twisted to rosulate.

The linear leaves dilate broadly low down, becoming imbricate-amplexicaul at base. This character, together with the brown and white spotting near base on outer surface of oldest leaves, gives the distichous leaf-cluster a strong resemblance to *A. Cooperi* Bak., but considerably smaller.

The shape, structure and colour of the flowers is almost identical with that of *A. Kraussii* Bak. and *A. Ecklonis* Salm Dyck, but smaller (12 mm.). In shape and size, the racemes are similar to those of *Leptaloe minima* (Bak) Stapf., and *L. myriacantha* (Haw) Stapf., the whole plant being about the size of *L. minima* or slightly smaller.

In March, 1941, Mr. H. Behrmann, owner of the farms " Fairfield " and " Moyeni," kindly sent a few plants to me which had been collected by Mr. W. F. Bayer on " Fairfield "—type locality cited by Berger. These plants, and those from Margate, were unquestionably one and the same species. In the Fairfield plants, the leaf margins were also minutely dentate low down, the teeth obsolete upwards.

Miss I. C. Verdoorn, botanist, Division of Botany, Pretoria, has drawn my attention to a sheet in the National Herbarium ; it is J. Medley Wood 9254, 5/2/1904, " flowers yellow " near Howick, Natal, 3—4,000 ft. This material clearly belongs to *A. linearifolia*, and establishes the present known distribution of the species from Margate to Dumisa to Howick, *i.e.*, from sea level to 3,500 ft.

The question now arises whether *A. linearifolia* should remain under *Aloe*, or be transferred to *Leptaloe*. In linear leaves (excluding the dilated basal part), inflorescence, raceme, and size of flowers (12 mm.), *A. linearifolia* fits the generic characters of *Leptaloe* * given by O. Stapf in Bot. Mag. (1933) t. 9300, *sub Leptaloe albida* (Bak) Stapf.

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* In my opinion it was a mistake to erect a new Genus for this group. They constitute a distinct Section under *Aloe*, hardly a distinct Genus.

However, since the dilating imbricate-amplexicaul basal portion of the leaves so closely resembles that of *A. Cooperi*, and especially since the shape and structure of the flowers is almost identical with that of *A. Kraussii* and *A. Ecklonis*, the Margate and Fairfield species, in my view, clearly belongs to *Aloe*, and not *Leptaloe*. In further support of this view, at a point 7·5 miles North of Port Shepstone, near the Southport turn off (*i.e.* 20 miles up the coast from the Margate locality), I found quantities of plants growing which were identical with the Margate plants except that all vegetative parts were much larger. Briefly, in these plants leaves reached 60 cm. long, inflorescence 50 cm. high, racemes capitate with flowers yellow, 16 mm. long and of the shape and structure of *A. Kraussii* and *A. Ecklonis*. These plants most clearly belong to *Aloe*, and being a larger, much more robust form of the small Margate and Fairfield species, it follows that the latter must also belong to *Aloe*, apart from the reasons given above.

Since Berger's description is scanty and also rather inaccurate and misleading in parts, the following emended description is proposed—based on some plants from cited type locality, and on several dozen examined in the field near Margate.

A. linearifolia Berger. *Roots* fusiform, 6 mm. diam. *Stem* none, or very short, usually simple, occasionally 1—2 branched at ground level. *Leaves* 6—8, usually distichous, rarely spirally twisted to rosulate, linear, about 25 cm. long, 5—8 mm. wide, the basal portion dilating thence imbricate-amplexicaul: upper surface green, immaculate, canaliculate; lower surface convex, rarely very obtusely very slightly carinate, the outer leaves copiously white and brown spotted near base; margins sometimes edentate, usually minutely dentate near base, the teeth obsolete upwards. *Inflorescence* simple, capitate, usually one only, rarely two, 20—25 cm. high. *Peduncle* about 4 mm. diam., clothed with a few scattered sterile bracts, the lowest 15 mm. long, 7 mm. broad at base, subscarious, pale brownish, about 7-nerved. *Raceme* capitate, the pedicellate portion 2 cm. long, 16—24 flowered. *Bracts* lowest up to 10 mm. long, 5 mm. broad at base, thin, subscarious, pale brownish, about 5—7 nerved. *Pedicels* lowest 12—15 mm. long, 20 mm. in the fruit. *Perianth* greenish-yellow to yellow, 12 mm. long, cylindric-trigonous, sub-stipitate and tapering at base into the pedicel, the mouth slightly upturned, somewhat stellate, distinctly not bilabiate. *Outer segments* free almost to base, obscurely 3-nerved, apices subacute, brownish tipped. *Inner segments* free, not cohering to the outer, broader than the outer, with a slight greenish keel. *Anthers* not or shortly exserted (1—2 mm.). *Stigma* at length exserted 1—2 mm. *Ovary* 3.5 mm. long, 2 mm. diam., 6-grooved, green. *Seeds* not seen.

Hab. : In sandy soil, 3 miles South of Margate, South Coast, Natal, fl. 23 Feb., 1941, Reynolds 3808 (typical) in Nat. Herb. and Bolus Herb. ; J. Medley Wood 9254, near Howick, Natal, fl. 5 Feb., 1904, in Nat. Herb. (Plate XIII).

I am particularly indebted to Mr. E. Schelpe for his invaluable assistance, and to Mr. H. Behrmann, Mr. W. F. Bayer and Mr. Jas. T. Foster for sending material collected at type locality.

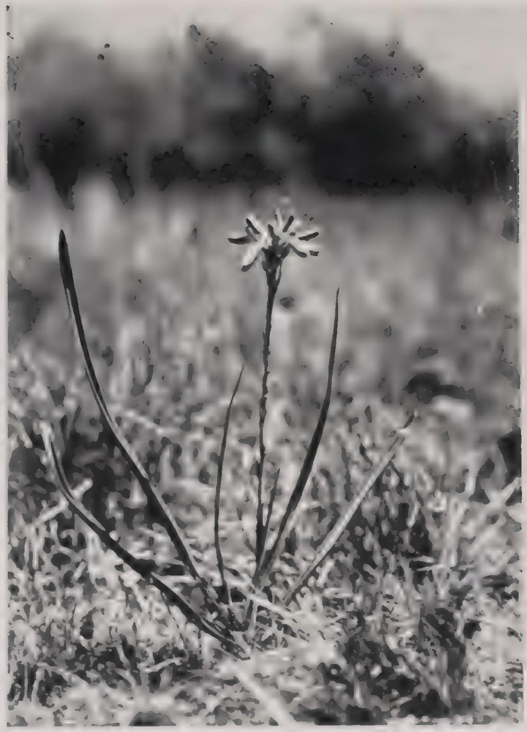

Fig. 1.

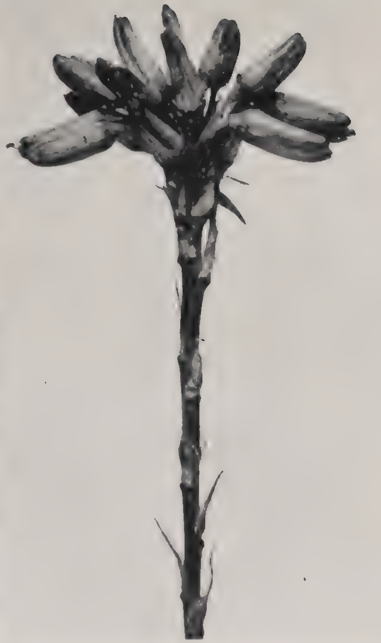

Fig. 2.

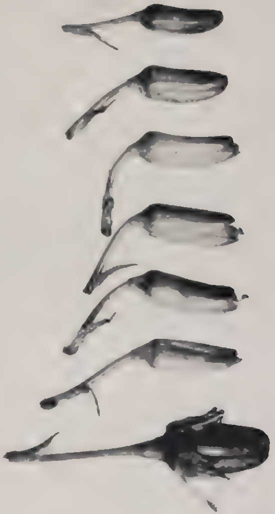

Fig. 3.

Plate XIII. *Aloe linearifolia* Berger.

Fig. 1. Plant in natural habitat × ¼, near Margate, fl. 23. Feb. 1941.
Fig. 2. Upper portion of peduncle with raceme, natural size.
Fig. 3. Flowers 1/1 from bud to fruit stage.

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WILLIAM JOHN BURCHELL, BOTANIST.

By HELEN M. McKAY.

Part IV: BOTANICAL INTERESTS FROM 1830-1863.

After an absence of five years, Burchell arrived once more at Fulham on 25th March, 1830. Owing to the death of his father and of R. A. Salisbury,(7) much of his time was now occupied with legal affairs: but, nevertheless, he corresponded with Swainson,(38) the Duncan brothers at Oxford,(47) and Lindley.(48) To Dr. William Hooker, who was still Professor of Botany at Glasgow University, he sent the account of his journey in Brazil. This was published in due course, but his boxes containing his collections remained unpacked for many years.

A few months after his return, he visited Oxford. This is confirmed by an entry in Dillwyn's(49) diary.*

> "Sunday, June 20, 1830.
>
> I dined with the Duncans at New College when I met Burchell the African Traveller, Genl. Peachey [Beechy ?] etc., and again met the same party at Dr. Buckland's in the Evening."

An evening spent with genial Dr. Buckland(50) could not possibly be a dull one, though matters other than botanical doubtless formed the topics for discussion.

In a letter† written to Lindley(48) on 10th December, 1830, he says:

> "With respect to my own future botanical labors, I have such abundant materials that I can well spare a few out of twelve thousand species. As it appears to me at present very uncertain when I may

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* *The Diaries of Lewis Weston Dillwyn.* Aberystwyth: The National Library of Wales.

† The Library, Royal Botanic Gardens, Kew. Letters MSS.

> have time, or even *room* to arrange my herbaria, I still think you ought not to neglect any offer from the Cape to collect for you: for, although you may receive them later than mine, there might perhaps be amongst them some species which may have escaped my search or of which I have no duplicates: especially as many species are very local, or very rare, or only visible for a short time in the year."

Memoir No. 17 of the Botanical Survey of South Africa, published in 1937, deals with *The Vegetation of the Divisions of Albany and Bathurst.* Dr. R. A. Dyer, the writer of the Memoir, remarks (page 15) :—

> "Systematic treatment of many of Burchell's novelties was forestalled by the early publications of descriptions of specimens collected by Ecklon and Zeyher and Drège about 15 to 20 years after Burchell's time."

Dr. Dyer has called attention to a fact which has not been fully appreciated by some botanists who have written about Burchell. In that letter which was sent to Lindley prior to Drège's second journey in South Africa (1832-34), Burchell shows that he foresaw difficulties such as Dr. Dyer indicates. It seemed futile, nevertheless, for him to act differently while he entertained a high standard regarding his filial duties.

Unfortunately, Lindley's reply to the letter of 10th December, has not yet been found, but it called forth another letter from Fulham, dated 20th December, 1830 :—

> "A plan which I have long had in view is to form, by means of the exchange of my own duplicates, a general herbarium consisting only of authentic specimens from authors, of named and published (or publishing) plants. Although I have had various proposals of exchange made to me, I have hitherto been prevented do[ing] any thing in this way, by the fear of creating confusion in nomenclature with respect to my undescribed species: having been desirous of delivering them with a well-settled name corresponding to my "geographical catalogue," a work I intend for publication both with a view to geographical [botany], and to its serving as a *clavis* to the printed labels now affixed to each specimen.
>
> I had adopted a mode of arrangement with De Candolle which at first I thought would answer very well the purpose of giving to the public my botanical discoveries earlier than I could find time for doing it myself: but this mode not having (I am sorry to say) been adhered to, I have no recourse but to defer the publication till I shall have examined and named them myself: a labor which, in the midst of too many other pursuits, must necessarily proceed but slowly.

> I should be very glad to possess from your own herbarium, duplicates of your published species, but, as it is to be my rule not to receive any till I can immediately give others in exchange, I can profit by your offer only prospectively. I continue always to bear in memory offers of this kind, and shall, as soon as it shall be practicable, commence with great pleasure the distribution of my duplicates.
>
> A preparatory step is, as I have before mentioned, the arrangement of my herbarium, and I should be glad if, at your leisure, you could inform me whether there has been published any *complete* synopsis of all the modern Natural Orders with the names of the genera included in each, during my absence in Brazil."

This letter may be considered as a confession of faith. It explains Burchell's conduct and proves to be false the accusations of hoarding, because of bitterness and jealousy, that were applied to him by some who seemingly misunderstood his actions.

Burchell was anxious, despite difficulties in his immediate environment, to proceed with the classification of what he was justified in considering valuable material. While he was still in Brazil, he had realised trouble ahead of him, for he wrote to Salisbury(⁷) from Rio, in 1826 :—

> " I daily feel the want of some complete system of Natural affinities. For unless the more laborious lucubrations of the sedentary Naturalists keep pace with the discoveries of the many travellers of foreign regions, we shall be soon overwhelmed with confusion of riches merely because the architects of systems have not provided proper places to receive them."

He had depended on De Candolle who found, by 1821, that he had begun to work out his new system of classification on too big a scale and then decided to continue his *Systema Naturale* in the form of a *Prodromus* to be issued in seventeen volumes. Burchell was naturally upset over the new arrangement. De Candolle's change in the form of presentation is commented on by Ernst Meyer, Professor of Botany at the University of Königsberg, when, in 1835, he says :—

> " I undertook to write commentaries on Drège's plants, not a *flora* of Southern Africa, since I think this can only be done when the illustrious De Candolle shall have published Burchell's plants, Ecklon and Zeyher theirs and I have completed those of Drège."

Burchell, in all good faith, waited for De Candolle ; others stepped in before him with their publications and, because he made no public statement about what had happened, misunderstandings arose. But the passing years were not without their interesting happenings.

During the early months of 1831, he was not enjoying good health ; he had a touch of fever and was suffering from lumbago and rheumatism. He was cheered, however, by visits from Henslow ;(51) from Dr. Roget, physician and writer of the famous *Thesaurus of English words and phrases ;* from General Hardwicke who had collected for the East India Company at Calcutta, and from his great friend Swainson. Later in the year, he visited the west of England and, needless to say, collected wherever he went.

On 18th June, 1832, the British Association for the Advancement of Science (founded in 1831), met at Oxford under the Presidency of Rev. Dr. Buckland.(50) Burchell attended the meetings and was elected to the Committee of Section IV which dealt with Zoology, Botany, Physiology and Anatomy, and which was presided over by Rev. P. B. Duncan.(47)

No ladies were allowed to be present at the gathering of *savants*, so his beloved sister Mary could not be with him ; but he wrote to her very cheerfully and said :—

> " I shall probably stop here the week ; but if anything more important requires me at home sooner, you must write."

With the exception of Geology, all scientific subjects (and especially Botany) were neglected in Oxford at the beginning of the nineteenth century, so it is not astonishing to read of " The Times " declaring meetings of the British Association as useless, and of Keble (the theologian and poet) thinking them beneath the dignity of the University. But the meeting at Oxford was a success, and Botany began to take on new life there.

Burchell served on the Committee of Section IV for two years, became a Life Member of the Association in 1835, and attended several of the annual meetings, the last at which he was present being the famous Oxford gathering of 1860.

A Visit to the Continent.

In September, 1832, he despatched 87 out of his 102 species of South African ferns to Greville(35) at Edinburgh, packed up all his African Compositae and set off, with a younger sister, to visit De Candolle at Geneva. They stayed at Paris for ten days, and naturally, Burchell called at the Jardin des Plantes to see Adrien de Jussieu who had succeeded his father as Professor of Botany there. His sister was eager to do the Grand Tour, so that left less time for botany than he wished to have ; but he considered the trip useful, for he made personal contact with several important botanists.

At Basle he stayed a few days, and was entertained by Dr. Meisner(52), with whom he corresponded in later years concerning his Thymeleae. He spent a week with De Candolle at Geneva. He had planned to sail down the Rhine, but found that, for political reasons and the prevalence of cholera in the country, it was judicious to avoid passing through Holland.

IN ENGLAND.

The year 1833 appears to have been an uneventful one so far as botanical work is concerned, except for visits to Oxford in connection with British Association Committee meetings, and correspondence with Lindley(48) about Orchideae and Bentham about Labiatae.

In May, 1834, the University of Oxford conferred on William John Burchell the highest degree which is in its power to bestow, the degree of Doctor of Civil Law, *Honoris Causa.* This was a remarkable honour in those days for a man who was not a graduate of Oxford, and who, in his published work, had advocated a new outlook on the study of the science of botany.

A week before Burchell received his degree, his friend Daubeny,(53) who had till then occupied the Chair of Chemistry, delivered his inaugural address as Professor of Botany and, on the day Convocation was held, gave the first of his course of lectures on Vegetable Physiology, a subject which Burchell had mentioned in his *Travels.** These happenings go to prove that in Oxford, Botany was now taking on a new lease of life; research work had begun and the subject was receiving attention from a viewpoint other than that of the herbalist, and that the gathering of plants was now regarded more than just a harmless and elegant occupation for the female sex.

Burchell seems to have visited Oxford at least once, if not twice a year, and from his letters it can be gathered that whenever he went there, he was happy and was always received as an honoured guest.

Regarding the ferns which had been sent to him, Greville(35) wrote in November, 1834 :†—

> "I have at last the pleasure of sending you the result of my examination of your ferns. I have gone through them with considerable care. You will observe there are a good many new species particularly in the genus Cheilanthes which seems to hold its head-quarters in South Africa. I am thinking of drawing up a Paper upon the collection for the *Cambridge Transactions*, as I believe a few plates would be allowed me and I could get a portion of the

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* *Travels*, I., page 255.

† This letter is an inset in the *Memoranda Botanica* MS. II.

> fronds of several species into each 4*to* plate. It is of great importance to get new species illustrated."

This shows that his South African material was receiving attention ; meanwhile, his Brazilian collection remained untouched.

ON THE CONTINENT.

Towards the end of 1837, Burchell set out, without any encumbrances, on a trip through Europe. In letters* written to his sister Mary, he gives a very interesting account of his tour. He comments on the country in general, tells of the people he met, and says that when he was obliged to speak German to make himself understood, he " produced a mixture of Dutch and French with Portuguese to give it a flavour."

He proceeded by way of Hamburg to Hanover, where he joined Olaf Hesse, a son of his old Cape Town friend, and they set out in a one-horse open carriage on a trip to the Hartz Mountains. They climbed the pine-clad Brocken, a mountain which Burchell considered was less interesting than the Welsh Cader Idris.

At Leipzig, he had the pleasure of once more meeting Tilesius,(28) now a very old man. They talked of the days spent on St. Helena, and Burchell was well supplied by him with letters of introduction to important individuals.

He was in Prague in November, 1838, and remarks :—

> " The climate is so much more severe here in winter than it is in England, that they are obliged to keep the Common holly, Furze, Rhododendron, etc., in greenhouses. I have been once to the Opera —in the better seats for 1/4—to the commemoration of Mozart's *Don Juan*, which he for the first time brought out at this theatre, just 50 years ago—so you may be sure it was performed in the greatest perfection possible."

In December, he was in Vienna, the easy-going, laughter-loving Vienna of tradition, and was received by the local potentate, Archduke John.

This Archduke had travelled extensively, and always took with him a qualified draughtsman. Burchell records that he spent much time talking about his travels in England and Turkey and " subjects connected with them." More letters of introduction were offered to him, and he was asked to visit Vienna again during the following summer.

While in this city, Burchell met Endlicher, Professor of Botany , with whom he later corresponded regarding Compositae.

* In the Library of Hope Dept. of Zoology (Entomology) Univ. Mus. Oxford.

By way of Venice, Padua, Bologna and Rome, he reached Naples about the beginning of May, 1838. He sailed from there to Marseilles, touching at Civita Vecchia, Leghorn and Genoa. He was away from Fulham for ten months. In a letter written to Swainson(38) in August, 1838, he says that on his return he was once more plunged into family cares and worries, one of them being that of a lawsuit, " so that I cannot yet get free to enjoy again my usual and more congenial pursuits, but trust that I shall be able gradually to resume them before long. It was a delightful tour and I would have extended it much further had I not found that my mother and sisters were anxious for my return."

IN ENGLAND AGAIN.

The year 1839 was marked by visits from Dillwyn(49) and the younger De Candolle; visits to Oxford; to the British Association meeting at Birmingham, and to Swainson, and correspondence began with Bentham about Erica.

From 1839 till 1842, when he jots down, " definitely gone through my herbarium (South African): sent Leguminae to Bentham," Burchell seems to have done little in the way of botanical work. Swainson left for New Zealand in 1840, and so there was broken a very close friendship which had lasted for twenty years.

Burchell was saddened. A widowed sister and her family returned to Fulham from Van Diemen's Land, and this made the unpacking of his Brazilian material altogether impossible. His mother died in 1841, and family sickness and sorrow hovered around for several years.

Sir William Hooker was appointed Director of the Royal Botanic Gardens at Kew in 1841. Though Burchell resided very near to him, visited Kew and was requested to write a testimonial for Dr. J. D. Hooker, when he was a candidate for the Chair of Botany at Edinburgh University in 1845, between the two men there was not now the close comradeship of the early days. Any suggestions made by Hooker seemed to annoy Burchell rather than to stimulate him to greater exertion.

A CONTINENTAL TRIP.

Along with his sister Mary, Burchell visited France and Belgium in 1850. A record of this visit, in the form of a detailed itinerary and several beautiful sketches, is still extant; but, except for noting that he spent some time with Sainte-Hilaire(54), he does not mention botany or botanists. He had travelled on the Continent three times, but had never been in Holland or Denmark. It is remarkable that, having been prevented from visiting these countries in 1832, he did not do so later on.

WORKING ON HIS HERBARIA.

From 1847 till 1861, Burchell, though now an old man, was actively engaged working on his herbaria. He started off by sending to Oxford several packing cases filled with a miscellaneous collection of natural history specimens, and among them were various sheets of South African plants, Strelitzia, Urania, Mahernia, Domax as well as some Fucus from Table Bay. Shortly after this he sent sheets of Madeira, Teneriffe and Portuguese material.

Among the notes in his *Memoranda Botanica* MS. 1, Part II., are a few of no importance but of passing interest. For instance, he gives a detailed account of the condition of his Brazilian specimens when he opened his packages between February, 1847, and February, 1850, seventeen to twenty years after the specimens had been collected. He says he paid 24/- per ream for his mounting paper : it was Imperial cap containing 472 sheets to the ream for the two outside quires had only 20 sheets each. Bought in small quantities, it cost 1/- for 20 sheets of 23″ x 15″. Another quaint entry is one about his labels (2½″ x ½″). They were printed in sheets of 128, and to cut up one of these took him 12 minutes.

While doing all this work, he was not entirely a recluse. He visited friends, went wandering in the New Forest in 1849, was at the British Association meeting at Hull in 1853, went to Matlock Bath, Buxton and Manchester in 1854, and was in the Lake district in 1855. During all these years, he was in close touch with Bentham, Daubeny and Greville.

He was aware of the fact that Harvey and Sonder were contemplating the publication of a *Flora Capensis*, and in 1857, he was communicating with Harvey about Muraltia. No letters giving more information about the transactions have as yet been found. A short note inserted in the *Memoranda Botanica* MS. is evidence that the two men were in touch with each other, if not directly, perhaps through a mutual friend, Polemann in Cape Town.

At a meeting of the Linnean Society in 1853, Bunbury(55) read a paper on the comparison of the botany of the Argentine with that of the Cape and New South Wales. Burchell listened to it with interest, and no doubt took part in the discussion which followed.

His last visit to Oxford was paid in 1860, when he attended that meeting of the British Association which was made famous because of the controversy between Huxley and the Bishop of Oxford concerning the Darwinian theory of the Origin of Species. Unfortunately, no letters or papers have yet been found to tell what Burchell thought of the theory : it would be of interest to know.

His health was failing, and from a letter (now among the MSS. in Oxford) written in February, 1863, to a friend residing near him in Fulham, it would appear that he had been an invalid for more than two years. He died under tragic circumstances on 23rd March, 1863.

No claim is made that this memoir published in *The Journal of South African Botany* in 1941 is, in anyway, a biography of Burchell, or a full record of his work in the botanical field. An endeavour has been made just to relate more or less chronologically a few outstanding incidents connected with his botanical work, in order to have a background against which there could be projected a fair estimate of his position among workers on the Science of Botany during the first half of the nineteenth century.

HIS CONTRIBUTIONS TO THE SCIENCE OF BOTANY.

Except for a short time while he was in St. Helena, Burchell held no public or professional office: he bequeathed no Prodromus, no Systema Naturale, no Genera Plantarum to the literature of Botany, and he did no laboratory work. But, " A multitude of careful observations spread over wide areas enables one to draw as sound conclusions from the working of Nature's own experiments as from the carefully controlled experiments carried out in the laboratory,"* and to his colleagues and to the generations following him, especially in South Africa, Burchell left words of wisdom, the result of his accurate observations and careful and penetrating meditations.

Serving along with him on the British Association Committee were Agardh(44), Bentham, Henslow(51), Lindley(48) and Robert Brown(43). All of them were first rank men in the small company engaged in the difficult task of freeing Botany from the trammels of the herbalist and the theologist, and of establishing it as a pure science and one worthy of a place for itself in the curriculum of the Universities.

In 1831, Lindley was asked to draw up a report to be presented to the British Association Meeting at Oxford in the following year, on *Catalogues of Country and Local Floras in preparation for a complete botanical survey of the British Islands.* The author of *Travels*, a personal friend of Lindley, and a member of the committee which discussed the subject, must have contributed valuable advice for he had given much time and thought to the making of catalogues.

If one reads some of the papers written by the leaders in botanical research in those days and then reads what Burchell had written many years before their work, one realises how stimulating and pervasive his influence must have been.

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* Bews, J. W.: S.A. Assoc. for the Advancement of Science. Pres. Address 1931.

The following may serve as an illustration. In his MS. journal, now in Oxford, there is an entry which he did not use in the *Travels*. When he wrote it, he was at the spot he called *The Garden*, in the vicinity of the present-day Kuruman, on 18th August, 1812. It reads :—

> "I took a walk along the valley to see if anything could be collected : but this seems to be the worst time of the year for insects and flowers, and even for birds, as the trees being destitute of leaves, renders it very difficult to approach them. I, however, met with an exceedingly neat and pretty Xeranthemum, which trails on the ground and which it covers like a tuft or patch of Moss. This beautiful little plant is one of the *Primitiae* of the Spring. In picking up some transparent Quartz pebbles I was surprised at finding the *under* Surface coated (or properly growing under them), with a fine moss : whilst no moss was anywhere else to be seen : I think it is caused by the transparency of the pebble which keeps the ground moist and admits light at the same time : this moss was of a beautiful grass green. If so, it follows, as a corollary, that the seed of mosses and perhaps ferns would readily vegetate and thrive under a white bell glass without the admission of air : provided the surrounding earth be constantly damp."

Someone before him may have expressed the same thought, but here it is, written by a man with no text book beside him, and no civilised human with whom to talk about it. But he must surely have spoken of it in after years, for his friend Professor Daubeny(53) carried out experiments and reported his findings in 1833, to the Royal Society and to the British Association, and in 1837, along with Ward(56) and Henslow(51), submitted a paper concerning "the experiments on the Growth of Plants under Glass and without any free communication with the outward air, on the plan of Mr. N. I. Ward(56) of London."

Daubeny(53) and Ward(56) were personal friends of Burchell, and no doubt they reaped the benefit of his experience in Nature's open air laboratory.

Among the leading botanists of his day he was honoured and revered, and it has always been considered a matter for regret that he did not write and publish more. Several people try to explain that he could not continue writing because he showed feelings of pettiness and jealousy when dealing with greater or more fortunate men than himself, and that by doing so, he hindered his own power of production. Even admitting that he might have had his moods and fancies, this does not give a satisfactory explanation for the curtailment of his literary work. But why regret the fact that he did not write more, when the question can be asked, "Has the fullest use been made of what he *has* written," and answered in the negative.

In his *Travels* he expresses his opinions on matters that are of vital interest at the present time, and does so with such a freshness that he seems to step in line with the trend of modern thought.

South Africa can claim him as one who loved and understood her. While wandering over her veld, her vast open solitudes, her deserts, her mountainous passes, or wending his way through her virgin forests, he observed, contemplated and apprehended, and when he did write his *Travels* he gave to the world a classic for which she provided the theme.

Having elected to set out his work in the form of an extended diary, Burchell's remarks on the botany of the country are scattered throughout the two volumes, and though the benefit derived from the reading of them repays any trouble which has to be taken in the finding of them, many people know little about some of the stimulating thoughts that are there for the seeking. There is an admirable index appended to Volume Two, and matters of botanical interest such as vegetable physiology, comparative botany, remarkable features in botany, as well as geography and botany can, by means of its help, be easily located in the narrative. But access to the volumes is not always easy and they are very costly. Perhaps one day a botanist will extract from them some of Burchell's pronouncements on botanical matters, and present in concise form what is now to be found only after perusing much text. By doing this, he would give to South Africa a work of historical interest in the literature of botany.

When Burchell entered in his note-book, "14 September, 1811, *Mesembryanthemum turbiniforme*, like a stone," it served as the foundation for his remarks on protective adaptations.* He was considered by Sir W. Thiselton-Dyer † as being closely on the track along which Darwin travelled. Many years before Darwin gave his theory to the world, Burchell had observed facts and stated what he considered was their basic principle. He differed from Darwin only in that he turned invariably to the supernatural for an explanation of the phenomena he encountered.

He pleads for a broad vision of things, and his words are very apt in these days of great specialisation. They are to be found in *Travels*, I., p. 226 :—

> "Too intent on some little parts of the edifice, we often remain totally ignorant of the proportions and perfect symmetry of the

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* *Travels*, I., p. 310.

† Thiselton-Dyer, W. T., Sir : *Annals of Botany*, Vol. XX, p. 123, 1906.

> whole. In the wide system of created objects, nothing is wanting : nothing is superfluous ; the smallest weed or insect is as indispensably necessary to the general good, as the largest object we behold. Each has its peculiar part to perform, conducive ultimately to the well being of all. Nothing more bespeaks a littleness of mind, and a narrowness of ideas than the admiring of a production of Nature, *merely* for its magnitude, or the despising of one, merely for its minuteness : nothing more erroneous than to regard as useless all that does not visibly tend to the benefit of *man*."

Marloth has stated that Drège was the first to establish distinct botanical regions in South Africa, and may be considered the founder of its Botanical Geography.* Certainly Drège marked out certain areas which appear to contain natural groups, and he gave what Burchell did not give, the altitudes at which he collected his specimens. MacOwan has suggested that Burchell laid the foundations of Botanical Geography in South Africa and that Drège very ably followed and supplied much greater detail.

Burchell certainly gave attention to the matter and did indicate that the country through which he travelled could be divided into areas where certain distinctive types of vegetation flourished. He remarks on the habitat of such outstanding features as the Stapelia, the Mesembryanthemum, the Euphorbia, the Protea and the Erica, but never mentions them as missing in any area without a qualifying notice, such as, " I met with this nowhere on *my* route after leaving the Colony." He realised too well the immensity of the country to suggest that he could supply the first general botanical survey of it.

In his *Remarks on the Map*, an appendix accompanying his map which was published in Volume One of the *Travels*, he describes how he arrived at his decision to divide the country through which he travelled, into five political areas. This appendix along with statements in the narrative should make the matter quite clear, but unfortunately some volumes are denuded of both the map and the remarks thereon, and so the *Transgariepine* [Beyond the Orange] was mistaken by someone as meaning the Transvaal !

One explanation offered for the absence of the appendices is that the *Travels* was in great demand during the South African war by the army intelligence department, and naturally the map and the text about it were of special value !

Credit must be given to Burchell for his perception of the various undertakings he deemed necessary for the development and progress of South Africa, and it is interesting to note how some of his suggestions have been, perhaps unconsciously, carried out. He wrote of the need for a good Botanical Garden at Cape Town, and for the planting of shrubs, trees, sedge and sand-grasses to bind the sand on the Cape Flats. In the valley at the foot of the Asbestos mountains he found a grass (C.G. 2570) " like the wire grass of St. Helena (*Agrostis linearis*, Willd. S.P.) near akin to the cocksfoot grass of the English farmer," and he considered this could be used as good grazing ground. His comments on agricultural matters are well seasoned with sound botanical knowledge.

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* Marloth, Rudolf : *The Flora of South Africa*, p. ix. 1913.

Burchell checked the accuracy of his appreciation of facts by giving verbal descriptions as well as executing graphic representations of them. His written accounts are always easy and pleasant to read, and his drawings are always satisfying and instructive. The sketches which are reproduced in Plates XIV-XVII are self-explanatory, but it might be added that, with the exception of the one of *Hemitelia* (which is an ink wash), they are in colour, which has shown no deterioration despite their age.

Much work awaits the botanist in this young country of South Africa, and, when tackling difficult problems, it is very often helpful to turn back to the old pioneers and find if they have any hints to hand on as to how to surmount obstacles and make discoveries. To no better counsellor can the young botanist turn than to William John Burchell. In these days of strife, speed, strain and striving let us take the advice he offers us in *Travels*, II, p. 333 :—

> " Experience teaches that many curious and *minute plants* will escape detection, unless sought with more than ordinary attention and that by sitting or standing still and carefully looking around, many interesting objects of natural history can be discovered, which otherwise would have been passed unheeded and unknown. In those parts of my journey where the riches of botany were more profusely scattered, I seldom sat down to rest myself during my rambles without perceiving some object which would not have caught my eye under any other circumstance."

If progress has to be made in any subject, there must be a clear appreciation of the history of its development, and if history is only an expansion of biography, the history of Botany may be most easily read in the life and work of the men who have wrestled from Nature some of her secrets. Burchell found many of these, and to him is due all honour and esteem for having so well and surely laid the foundations of Botanical Science in South Africa.

BIOGRAPHICAL NOTES.

(47) **Duncan, John** and **Philip**, two brothers who did much for the cause of Science. Both held the office of Keeper of the Ashmolean Museum, Oxford: John from 1823-9 and Philip from 1829-55.

(48) **Lindley, John** (1799-1865), Assistant Librarian to Sir Joseph Banks. Secretary to the Royal Horticultural Society, 1822-60: Professor of Botany at University College, London, 1828. He was mainly responsible for Kew Gardens being preserved and made over to the nation. He took a conspicuous part in building up the natural system of classification, and has been described as an evolutionist without knowing it.

(49) **Dillwyn, Lewis Weston** (1778-1855), botanist, conchologist and potter, was born at Ipswich and was in the Turner-Hooker circle. Removed to Swansea in 1803. Collaborated with Dawson Turner in *The Botanists' Guide through England and Wales*, 1805. He wrote on the local flora and fauna of Swansea. He was M.P. from 1832-37.

(50) **Buckland, William** (1784-1856), wit, geologist and divine, was Professor of Mineralogy, 1813, and Reader in Geology, 1819, at Oxford. He became Dean of Westminster in 1845. His famous Bridgewater Treatise of 1836 was a buttress of science as applied to contemporary theology. His drollery and quaint stories were famous.

(51) **Henslow, John Stevens** (1796-1861), along with Sedgwick, founded the Cambridge Philosophical Society. He became Professor of Botany in 1827. Darwin was one of his pupils. In 1837 he took the crown living at Hitcham, Suffolk, and there introduced a voluntary study of botany in schools, and encouraged horticultural shows. He was a member of the Senate of London University and was examiner in botany there in 1838.

(52) **Meisner, Charles Frederick** (1800-1874), was educated at Vevey, Vienna and Paris. His father was of Hanoverian origin, but was settled in Berne. Meisner contributed to De Candolle's *Prodromus*, to *Linnaea*, *Botanische Zeitung*, Hooker's *Journal of Botany* and to *Flora Brasiliensis*. He published in 1836-43 his *Plantarum vascularium genera*. His extensive herbarium was sold at his death to Columbia College, New York.

(53) **Daubeny, Charles Giles Bridle** (1795-1867), M.D., was Professor of Chemistry, 1822-55, of Botany, 1834, and of Rural Economics, 1840, at Oxford. His paper "*On the Sexuality of Plants*," read at the Brit. Association meeting in 1860, gave strong support to Darwin. He was a droll little figure, and his portrait is certainly reminiscent of Mr. Pickwick's immortal features.

(54) **Saint-Hilaire, Auguste de** (1799-1853), was a French traveller and naturalist. He collected in Brazil in 1816. Among his publications were: *Flora Brasiliae meridionales ou Histoire et Description de toutes les plantes qui croissent dans les differentes provinces du Bresil* (1824) and *Voyage dans les provinces de Rio de Janeiro et de Minas-Geraes* (1830).

(55) **Bunbury, Charles James Fox**, 8th Baronet; (1809-86) F.R.S. and F.L.S., was the writer of *Botanical Fragments*, published in 1883. Burchell met him at the Linnean Society, and Bunbury quoted Burchell's opinion about both botanical and zoological specimens.

(56) **Ward, Nathaniel Bagshaw** (1791-1863), M.D. and botanist, was the inventor, about 1827, of the Wardian case, in which growing plants can be transported, without watering, through the extremes of heat or cold. By its means tea plants were taken from Shanghai to the Himalayas and the cinchona introduced into India.

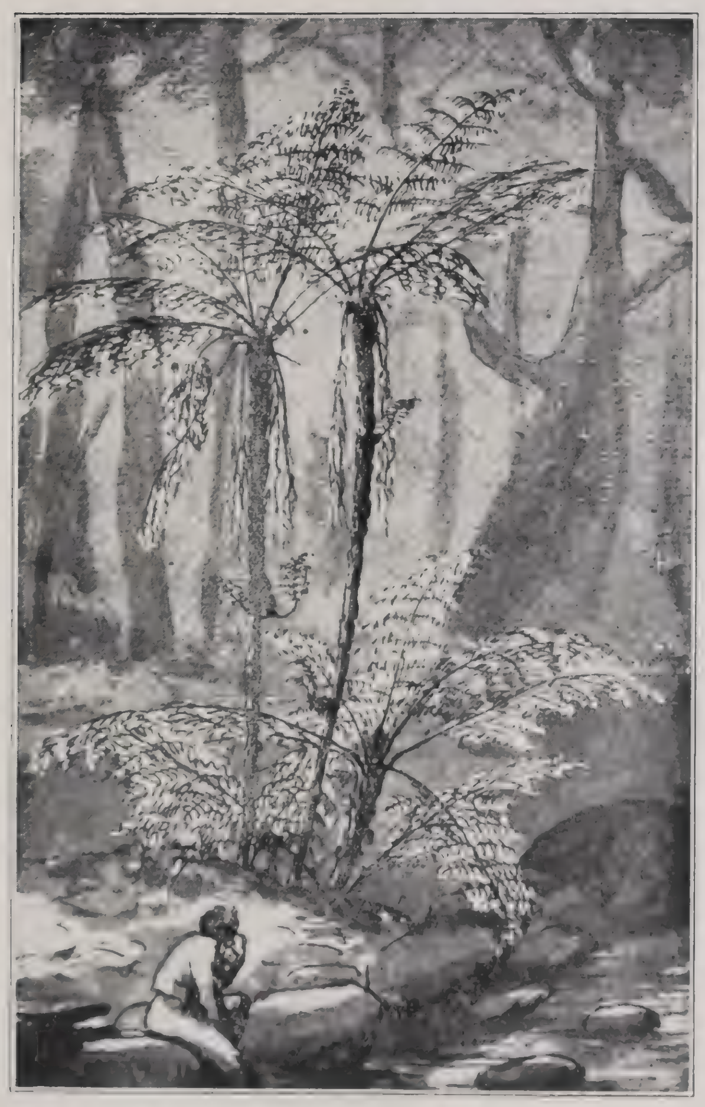

PLATE XIV. *Hemitelia capensis* at Groote-vaders-bosch.
Drawing, inkwash : Wm. J. Burchell.
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Photo : James L. Smith, Johannesburg.

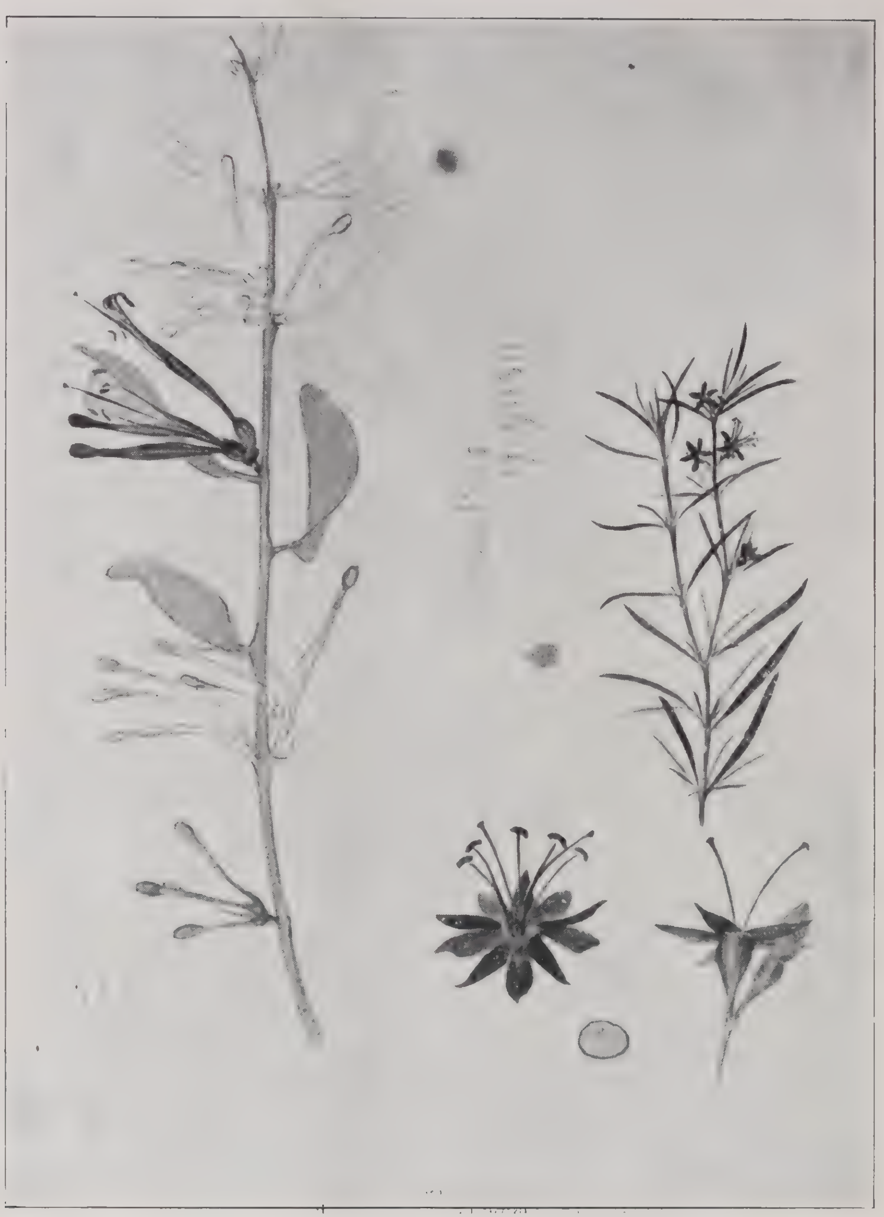

Plate XV. *Loranthus sp.* " in super ramos, Haakdoorn," at Shallow Ford, Orange River. *Vahlia sp.* at the confluence of the Vaal and Riet River.

Drawings, tinted: Wm. J. Burchell.

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Photo : James L. Smith, Johannesburg.

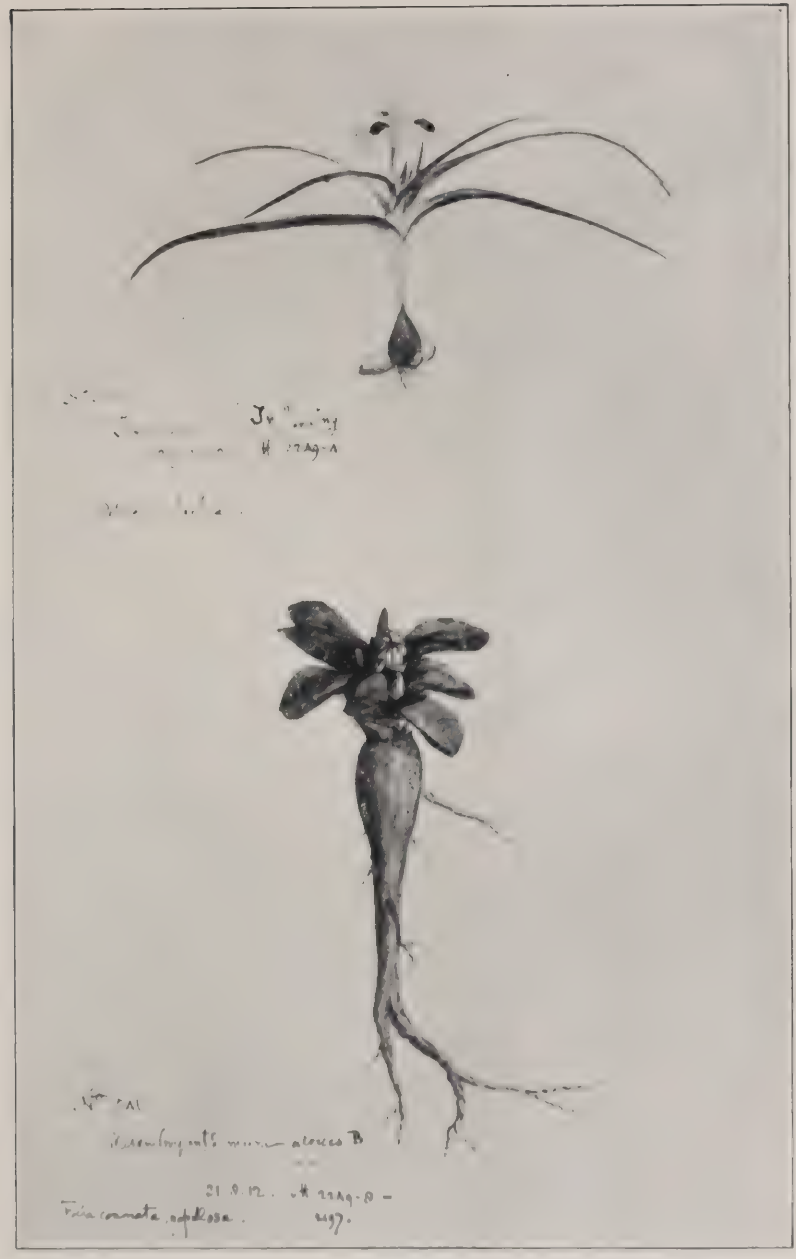

PLATE XVI. *Morea papilionacea* at Pintado Fountain: *Nananthus aloides* at Jabiru Fountain: both in Kuruman Division.
Drawings, tinted: Wm. J. Burchell.
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Photo: James L. Smith, Johannesburg

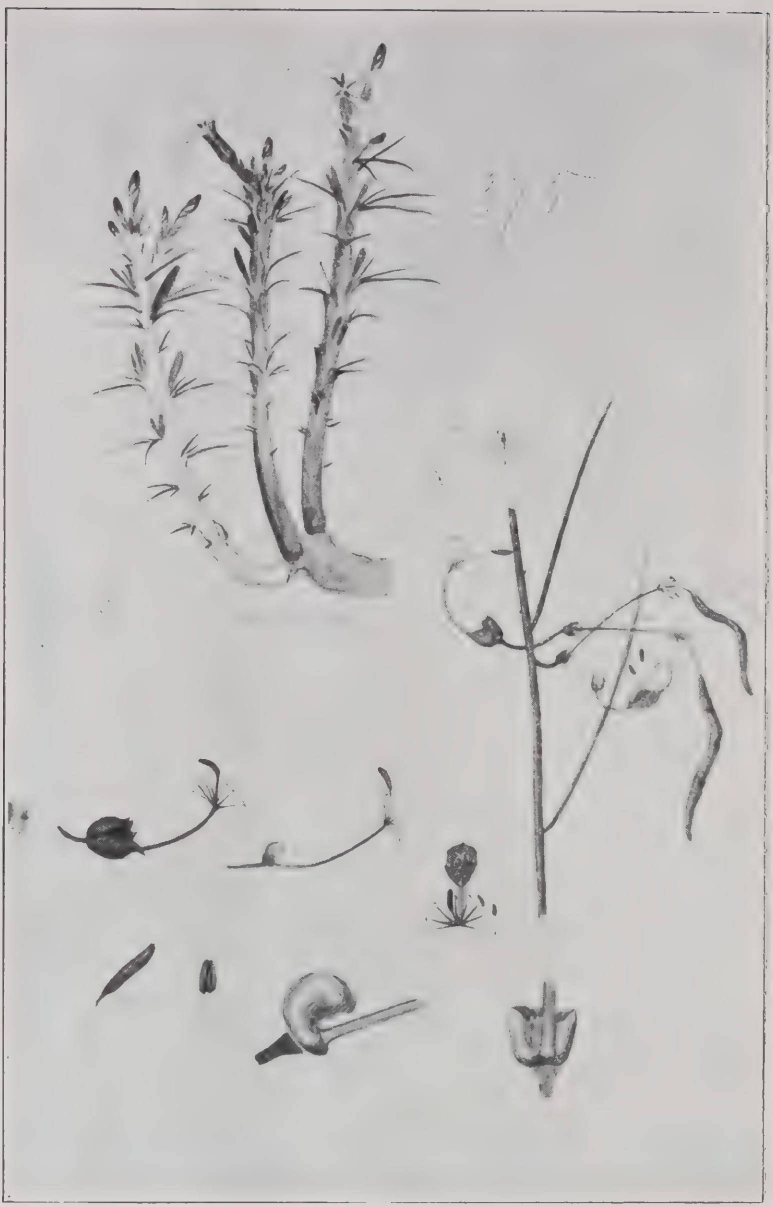

PLATE XVII. *Pachypodium succulentum : Cadaba juncea :* both at the Kloof Village in the Asbestos Mountains.

Drawings, tinted : Wm. J. Burchell.

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Photo : James L. Smith, Johannesburg.

PLANTAE NOVAE AFRICANAE.

"Ex Africa semper aliquid novi."—*Pliny.*

SERIES XVII.

By

PROFESSOR R. S. ADAMSON, PROFESSOR R. H. COMPTON, MISS W. F. BARKER and MISS P. BOND.

Anthericum palustre Adamson. (Liliaceae).

(§*Trachyandra.*)

Rhizoma breve radicibus pallidis pluribus. *Folia* 9—15, angusta, semiteretia, superne subcanaliculata, 2—3 mm. lata, glabra, basi in vaginam anguste marginatam dilatata, fibris foliorum antiquorum plus minusve persistentibus. *Pedunculi* erecti vel saepius basi decurvati, 20—30 cm. alti, simplices vel pauciramosi. *Racemi* laxi floribus veteribus deciduis. *Pedicelli* tenues, 7—9 mm. longi, apice articulati. *Bracteae* triangulares basi dilatatae vel etiam subamplexicaules, apice subulatae, pedicellis duplo vel triplo breviores. *Perianthii* segmenta 9—12 mm. longa, externa angustiora. *Filamenta* staminum muricata. *Fructus* erectus vel adscendens, rotundus at apice paulo depressus et superne leviter trisulcatus, 6 mm. longus, 6—8 mm. latus. *Semina* plurima angulata.

Hab. Wet places with humus soil: peaty swamps and on wet sheltered rocks on the mountains above 2,000 ft. The flowers open about 2.30 p.m. Cape Peninsula: Table Mt. Nursery Buttress, *Compton*; Skeleton Gorge, *Adamson* 2743; Echo Valley, *Pillans*; *Adamson* 2742; Patrys Vlei, *Salter* 8472 (type in Herb. Bolus); *Adamson* 2937, 3025; Sirkel's Vlei, *Adamson* 3084.

A distinct species allied to *A. tabularis* Baker but quite different in habitat, leaf, and bract. The leaves of plants from peat swamps are stiff and erect, from wet rocks soft, drooping and often very long.

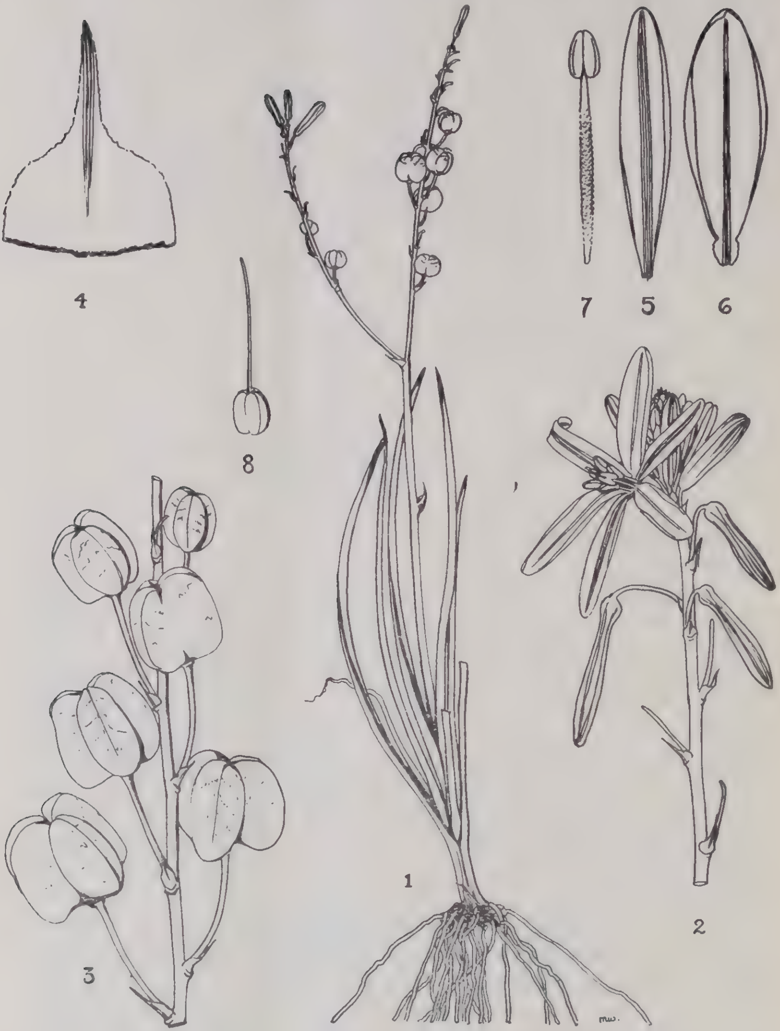

FIG. 1. *Anthericum palustre*. 1. Complete plant × ½. 2. Top of inflorescence × 4. 3. Inflorescence in fruit × 4. (N.B. The sulcation on the fruit is represented too deep.) 4. Bract × 20. 5. Outer perianth segment × 8. 6. Inner perianth segment × 8. 7. Stamen × 8. 8. Ovary and style × 8. (*Adamson* 3025.) *Del.* M. Walgate.

A. stenophyllum Adamson.

(§*Trachyandra.*)

Rhizoma breve, erectum vel horizontale radicibus albis subcarnosis. *Innovationes* vaginas foliorum rumpentes. *Folia* 2—6, saepius 2—3, erecta, tenuia, semiteretia superne plana vel leviter canaliculata, 2 mm. lata, 40—50 cm. longa, basi rubra, in vaginas anguste marginatas dilatata. *Folia primordia* scariosa parva. *Pedunculus* erectus, tenuis, glaber, 50—60 cm. altus, simplex vel superne ramis 1—2 ascendentibus. *Racemi* tenues. *Pedicelli* apice articulati, 2—4 mm. longi, ascendentes, bracteis subulatis basi dilatatis paulo longiores vel subaequantes. *Perianthii segmenta* 6—8 mm. longa, alba, externe rubra. *Stamina* perianthio breviora, filamentis muricatis. *Fructus* sphaericus, purpureus, 5 mm. diametro. *Semina* angulata.

Hab. Heathy sand where moist in winter. Fl. Feb. Cape Peninsula: Smitswinkel Bay, *Adamson* 3128 (type in Herb. Bolus); base of Paulsberg, *Adamson* 3127; Rooihoogte, *Adamson* 3154.

In flower and inflorescence most like *A. brachypodum* Baker but quite different in leaf, and usually a much more slender plant. The flowers open one at a time about 3 p.m. Plants coming up after fires are stouter with a more branched inflorescence and leaves 3—4 mm. wide.

A. brachypodum Baker var. **caespitosum** Adamson.

A typo differt: *caulibus* dense caespitosis; *foliis* sempervirentibus, longioribus, latioribus, 4—5 mm., planis, marginibus vix incrassatis; *floribus* majoribus.

Hab. Cape Flats: on sand under shelter of trees or bushes. Rare. Fl. Feb. Cape Peninsula: between Rondebosch and Kenilworth, *Adamson* 2789 (type in Herb. Bolus).

Forming dense tufts with the leaves persistent throughout the year. The leaves have strong fibrous ribs but not thickened edges. The flowers open in the late afternoon, 5 p.m., and several at a time.

Cotula pedicellata Compton. (Compositae-Anthemideae.)

Herba annua, molliter pilosa, simplex vel pauciramosa. *Folia* basalia, petiolata, 1—2-pinnatisecta, segmentis linearibus, apiculatis. *Pedunculi* scapiformes, erecti, elongati. *Capitula* solitaria, discoidea. *Involucri bracteae* multiseriatae, oblongae ad orbiculatae, apicibus obtusis, membranaceis. *Flores* numerosi, pedicellati, tubulares, bisexuales, steriles fertilesque intermixtae. *Corollae lobi* 4, flavi. *Achaenii* glabri, complanati, scarioso-marginati.

Hab. Cape Province: Van Rhynsdorp Division; a few miles north

of Van Rhynsdorp, *Bond* 1126, 23 July 1941, (type in National Botanic Gardens Herbarium); Klaver, *Compton* 5446, 31 August 1935; *Lavis* in Herb. Bolus 20255, August 1932; Mathews, N.B.G. 1936/31. Clanwilliam Division; Clanwilliam, *Schlechter* 5055; *Compton* 11005, 20 July 1941.

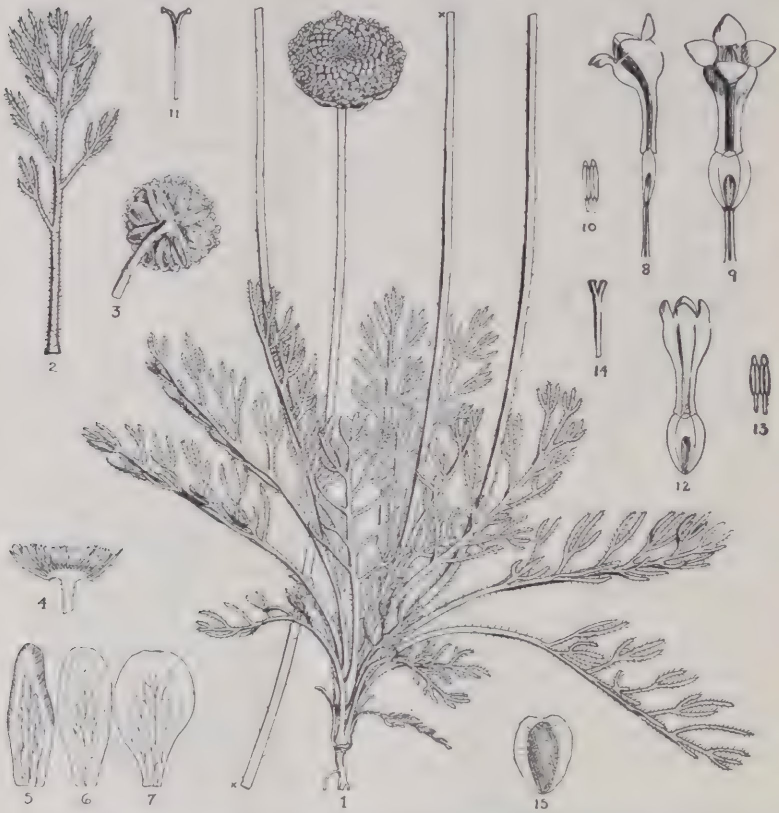

Fig. 2. *Cotula pedicellata.* 1. Plant. 2. Leaf. 3. Capitulum from below. 4. Young capitulum in vertical section. 5, 6, 7. Involucral bracts; 5, outer, 6, median, 7, inner. 8. Outer floret, tangential view, 9. radial view. 10. Stamens. 11. Style. 12. Inner floret, immature, radial view. 13. Stamens. 14. Style. 15. Ripe achene. 1—4, nat. size. 5—7, × 3. 8—15, × 6. (1—14, *Bond* 1126; 15, *Compton* 5446). *Del* M. Walgate.

Description. An annual herb, simple or shortly branching, from a few to about 30 cm. in height. *Leaves* in a sub-basal tuft, up to about 7 cm.

long, softly pilose throughout, the base sheathing with a distinct midrib, the lower half petiolar, the upper half 1—2-pinnatisect, the segments linear, minutely apiculate. *Peduncles* terminal, erect, scape-like, pilose at base with a few scattered hairs throughout, up to 30 cm. long. *Capitulum* solitary, discoid, variable in size up to 25 mm. diam. *Involucre* of numerous imbricate bracts in three or four layers, thinly pilose, the outermost bracts oblong, the innermost orbicular, all obtuse and membrane-tipped. *Florets* very numerous, all pedicellate, the pedicels up to 3 mm. long, all hermaphrodite with good-looking pollen and stigmas : some florets are apparently sterile with a flat elliptical empty ovary, others fertile with an obovate membrane-winged ovary ; the latter also having thicker pedicels and corolla tubes than the former : sterile and fertile florets are intermingled. Corolla-tube 1·3 mm. long, with a shortly deflexed basal frill in front and back ; the distal portion 2·3 mm. long with four spreading yellow lobes. *Achene* brown, glabrous, flattened, 2·3 mm. long, 1·7 mm. wide, membrane-winged.

A handsome species which occurs in abundance in good seasons in sandy ground near van Rhynsdorp and Klaver. It belongs to the § Disco-Cotula, all the florets being hermaphrodite with 4-lobed corollas. It is most closely related to *C. Thunbergii* Harv., and like that species it has many of its florets abortive, not producing achenes though having good-looking pollen and stigmas : its corolla also has a short overhanging basal frill as in that species. (In *Compton* 11005 the frill is larger than in other gatherings.) From *C. Thunbergii*, however, it differs in its greater size in all parts, in having all of its florets markedly pedicellate, and in its membrane-winged achenes.

Crotalaria lebeckioides Bond. (Leguminosae—Genisteae.)
(*Eucrotalaria—Mediocriflorae.*)

Fruticulus virgatus. *Folia* trifoliata, longe petiolata. *Foliola* anguste elliptica, obtusa, marginibus parum inflexis. *Racemi* terminales, laxe c. 6—8-floriferi. *Bracteae bracteolaeque* minutae. *Calyx* late cyathiformis‘ obliquus, segmentibus deltoideis. *Corolla* flava, magnitudine mediocre, in siccitate subfusca ; carina rostrata, alae late oblongae, vexillum orbiculare. *Stamina* monadelpha, inaequalia. *Ovarium* stipitatum, c. 9-ovulatum ; stylo geniculato. *Legumen* turgidum, puberum.

A small erect shrub about 60 cms. high, virgate, glaucous, with very minute scattered appressed hairs in all parts. *Branches* erect, terete, striate. *Leaves* digitately trifoliate ; petioles erect, slender, slightly channelled, up to 4 cms. long ; leaflets spreading, linear to narrowly elliptic, obtuse, margins slightly inflexed, up to 1·5 cm. long and 2 mm. broad, dropping off before the petioles. *Racemes* terminating the branches, about 10 cms. long, laxly 6—8-flowered; bracts minute. *Pedicels* c. 5 mm. long, minutely bibracteolate just above the middle. *Calyx* c. 5 mm. long; tube broadly cyathiform, oblique; segments subequal, deltoid. *Corolla* bright yellow turning dusky on drying, glabrous; carina c. 12 mm. long, acute, rostrate, longer than the oblong alae (c. 10 mm. long, 4 mm. wide), equalling or shorter than the reflexed orbicular vexillum (10—12 mm. long). *Stamens* monadelphous, unequal, 5 longer and stouter filaments bearing linear anthers, alternating with 5 shorter and more slender filaments bearing ovoid anthers. *Ovary* stipitate, oblong, silky villous along ventral suture, about 9-ovulate; style geniculate, bearded; stigma terminal, minute. *Legume* puberulous, turgid, stipitate, c. 2·5 cm. long and c. 7 mm. broad.

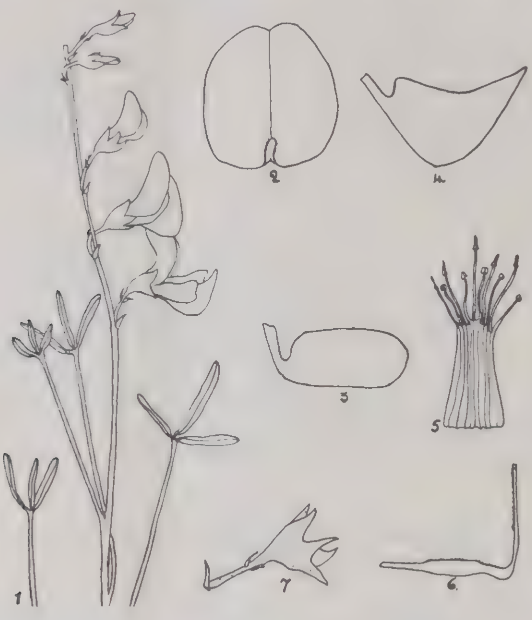

FIG. 6. *Crotalaria lebeckioides.* 1. Branch, nat. size. 2. Vexillum. 3. Ala. 4. Carina. 5. Stamens. 6. Ovary. 7. Calyx. All × 2. (*Compton* 8733.) *Del.* P. Bond.

Hab. Cape Province. Ladismith Division: Prins Poort, 4 May 1940, *Compton* 8733 (Type in National Botanic Gardens Herbarium): same locality and date, *Esterhuysen* 1813: same locality, 23 September, 1941, *Compton* 11746 (fruiting).

In habit and foliage this species resembles a Lebeckia, but the very swollen fruits put it in Crotalaria.

The long petioles, small leaflets, medium-sized flowers, almost glabrous appearance and dusky colour on drying make a very distinctive ensemble of characters.

Erica Esterhuyseniae Compton. (Ericaceae-Ericoideae.)

§ Ephebus. Frutex erectus, ramosus, puberulus. *Folia* 3—4-nata, petiolata, lanceolata sulcataque, vel ovata subapertaque, obtusa. *Flores* terminales, aggregati. *Bracteae* 1—3, medianae vel subapproximatae. *Sepala* angusta, appressa, obtusa, pubescentia. *Corolla* urceolata, pubescens ad hirsuta, segmentis patentibus. *Antherae* inclusae, anguste cristatae. *Ovarium* turbinatum, hispidulum. *Stigma* capitata, inclusa.

Var. α **tetramera** Compton.

Folia 4-nata.

Hab. Cape Province : Uniondale Division : Kamanassiberg (Mannetjeberg), alt. 1,700 met., 1 Feb. 1941, *Compton* 10557. (Type in National Botanic Gardens Herbarium) ; same locality and date, *Esterhuysen* 4762.

Var. β **trimera** Compton.

Folia 3-nata.

Hab. Cape Province. Oudtshoorn Division : Swartberg Pass, alt. 2,000 met., 28 Jan. 1941. *Bond* 866 (Type in National Botanic Gardens Herbarium) ; same locality and date, *Esterhuysen* 4513, 4772. Ladismith Division ; Klein Swartberg Peak, 2,200 met., *Stokoe* 1768a, 28 December 1928.

Description. A small erect much-branched shrub with densely puberulous stems and leaves. *Leaves* whorled, 3-nate (var. *trimera*) or 4-nate (var. *tetramera*), 2·5—3 mm. long including the well-developed petiole, about as long as the internodes, often with axillary fascicles, from lanceolate and sulcate to ovate and sub-open-backed, erecto-patent, somewhat inflexed, obtuse. *Flowers* in small terminal clusters. *Pedicel* 1·5 mm. long. *Bracts* 1—3, variable in size, median to sub-approximate. *Sepals* linear to lanceolate, 1·5 mm. long, appressed to corolla, obtuse, pubescent. *Corolla* urceolate, 3 mm. long, the segments spreading, pubescent to hirsute. *Stamens* with slender slightly flexuous filaments ; anthers included, 0·7 mm. long, narrow-crested. *Ovary* turbinate, hispidulous ; stigma capitate, included.

These two plants are clearly closely related to one another, and I prefer to regard them as belonging to a single species and to distinguish them on the basis of the number of leaves in the whorl. Both varieties were collected within a few days of one another on the crests of adjoining mountain ranges, the localities being about 55 miles apart. The two sets of drawings here reproduced represent plants from the two localities and depict some of their variations in feature.

The shape of the leaves varies to some extent, being broadly ovate and sub-open-backed in some of the Swartberg plants (*Bond* 866, *Esterhuysen* 4513), lanceolate and sulcate or slightly open-backed in other Swartberg plants (*Esterhuysen* 4772) and in the Kamanassiberg gathering (*Compton* 10557).

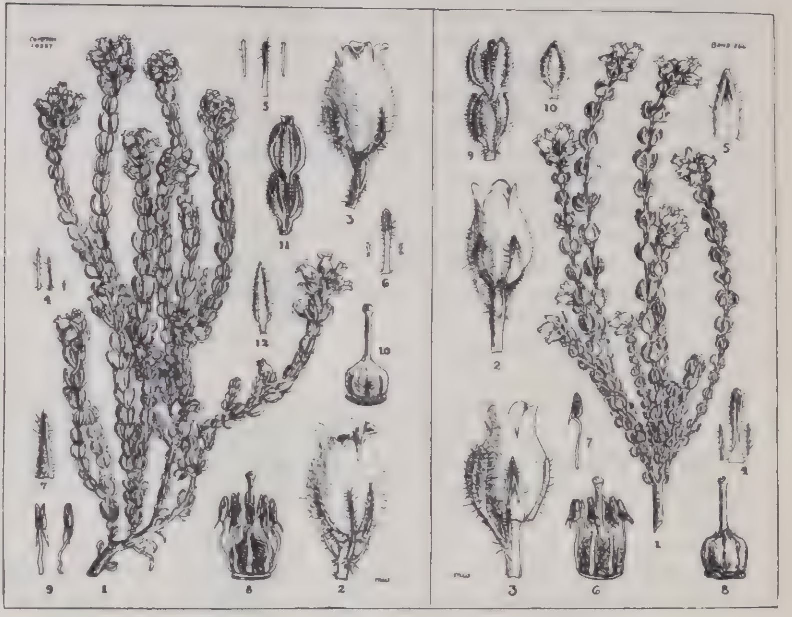

FIG. 3. *Erica Esterhuyseniae. Left*: var. *tetramera.* 1. Portion of plant, nat. size. 2, 3. Flowers × 5. 4, 5, 6. Bracts × 5. 7. Sepal × 5. 8. Stamens and Ovary × 5. 9. Stamens × 5. 10. Ovary × 5. 11. Part of branch × 2. 12. Leaf from below × 2. (*Compton* 10557.) *Right*: var. *trimera.* 1. Portion of plant, nat. size. 2, 3. Flowers × 5. 4. Bracts × 5. 5. Sepal × 5. 6. Stamens and ovary × 5. 7. Stamen × 5. 8. Ovary × 5. 9. Part of branch × 2. 10. Leaf from below × 2. (*Bond* 866.) *Del.* M. Walgate.

The bracts show much variation in form and position in different flowers on the same plant. In some cases three bracts are present, one being 2·0 mm. long, subspathulate, sulcate and approximate, the other two being 0·5—1·0 mm. long and very slender. In other flowers two bracts are present, and in others again only one minute bract occurs.

The degree of hairiness of calyx and corolla varies considerably. The flower pigmentation varies, the corollas of *Esterhuysen* 4772 being recorded as "yellowish," of *Esterhuysen* 4513 as "white to pink," and of *Compton* 10557 as "white."

In the genus Erica the number of leaves in the whorl is usually regarded as of considerable significance, and in the Flora Capensis, for instance, Guthrie and Bolus use the 3-nate and 4-nate characters in the primary sub-division of the § Ephebus. In *E. Esterhuyseniae*, however, this meristic difference seems to have less systematic importance.

There is a possibility that *E. straminea* Wendl. may be conspecific. Guthrie and Bolus did not see a specimen of this, but adopted the species on the strength of Wendland's "excellent" description and "good" figure. The figure, as compared with *E. Esterhuyseniae*, shows a shorter and broader corolla and a shorter style, and the anther looks different in shape and scabridity: no locality is recorded. It is possible that Wendland's plant was the same as the present species (in which case his figure could not be called "good"), but in the circumstances I prefer to regard it as a distinct plant and to describe *E. Esterhuyseniae* (of which there is abundant material) as new.

Euryops annuus Compton. (Compositae-Senecioneae.)

Herba annua, glabra. *Folia* basalia irregulariter bipinnatipartita. *Pedunculi* elongati, erecti, scapiformes. *Involucri bracteae* c. 15, basi concretae. *Receptaculum* planum, epaleaceum. *Flores radii* c. 13, ligulati, feminei; *disci* numerosi, tubulares, bisexuales. *Stigmata* truncata. *Antherae* exappendiculatae. *Achaenii* squamoso-pubescentes. *Pappi setae* paucae, flexuosae, barbellatae, percaducae.

Hab. Cape Province. Calvinia Division; Vogelstruisvlakte, *Compton* 11138, 26 July 1941. (Type in National Botanic Gardens Herbarium); same locality and date, *Esterhuysen* 5324. Ceres Division; Gansfontein, *Compton* 5427, 26 August 1935; Tanqua Karoo, alt. 500 met., *Compton* 7283, 10 July 1938; Tanqua Karoo near Ymasqua, *Compton* 7924, 7 August 1938.

Description. An annual herb, glabrous throughout, from a few to 30 cm. in height. *Leaves* several in a dense basal tuft, up to 9 cm. long, herbaceous or subsucculent, irregularly bipinnatipartite in the distal 2/3, the lobes narrow, obtuse, oval in section, with indistinct veins. *Peduncles* rising from the base of the plant, few, erect or deflexed at the base, slender, terete, rigid, nude, up to 30 cm. long. *Capitula* solitary, erect, variable in size, up to about 4·5 cm. in diameter. *Involucre* green, the concrescent receptacular base up to 1·5 cm. in diameter, the margins turned up vertically and ending in about 15 acute green lobes

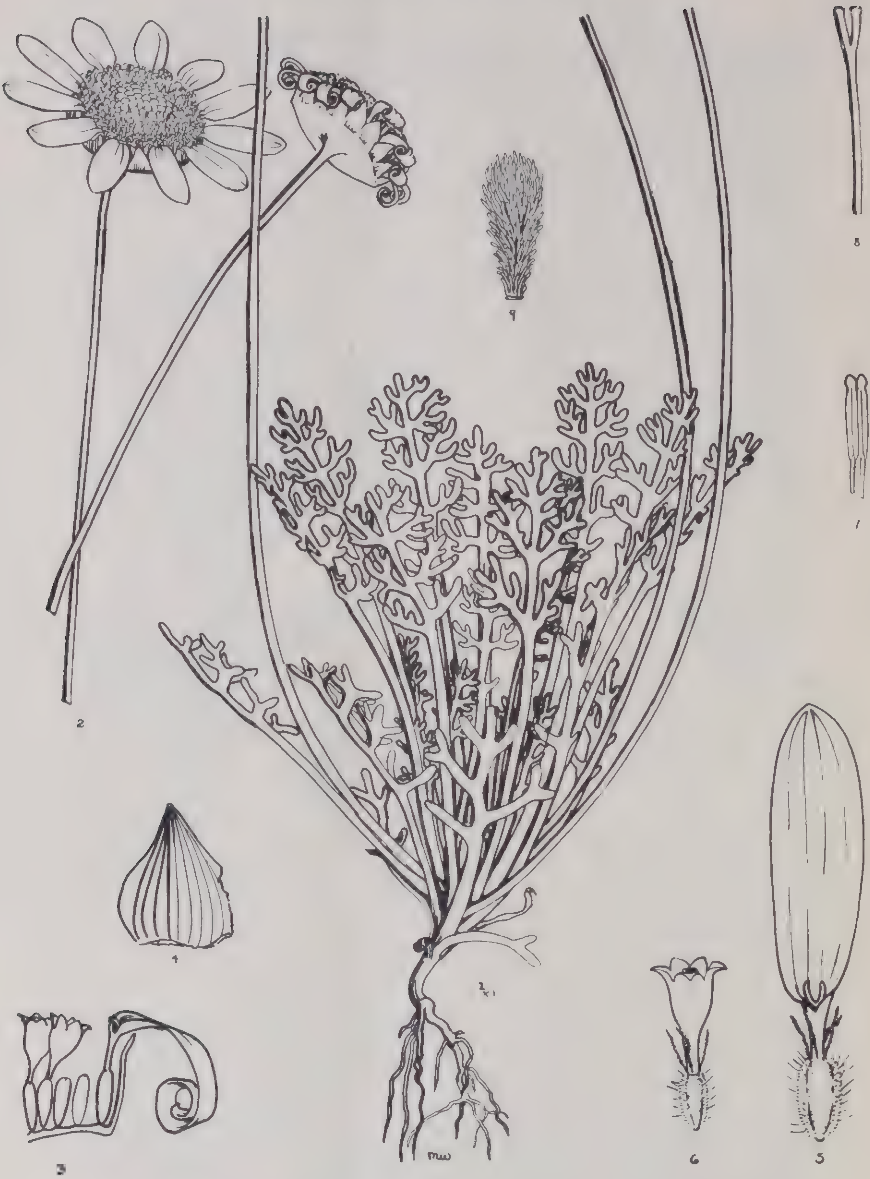

FIG. 4. *Euryops annuus.* 1. Plant, nat. size. 2. Capitula, nat. size. 3. Vertical section of part of capitulum × 3. 4. Involucral scale × 5. 5. Ray floret × 5. 6. Disc floret × 5. 7. Stamens × 10. 8. Stigma × 10. 9. Ripe achene × 10. (*Compton* 7283.) *Del.* M. Walgate.

which overlap slightly and are narrowly membrane-edged and without distinct midrib. *Receptacle* flat, slightly honeycombed, without paleae. *Ray florets* about 13, female, ligulate, the free portion up to about 15 mm. long, horizontal, deflexed on fading, bright yellow. *Disc florets* numerous, the corolla tubular below, campanulate above, 4 mm. long, yellow. *Stigmas* truncate, bristly at their tips. *Anthers* without appendages. *Achenes* numerous, about 2 mm. long, cylindrical, obtuse at both ends, densely squamose-pubescent. *Pappus* of a few white flexuous barbellate bristles, about 1·2 mm. long, very caducous.

Euryops annuus is definitely an annual plant : in this respect it differs from all previously described species. The characters of capitulum, pappus, peduncle, leaves, etc. are such as to place it in Euryops rather than in any other genus : the only alternative being Oligothrix, which includes certain little-known plants of annual habit with a small number of pappus bristles of the Euryops type. With Oligothrix, however, my plant shows less general affinity than with Euryops, and I have little hesitation in choosing the latter genus for its reception.

In 1935 and 1938 a very few of the plants were seen in limited spots in the barren Karoo area through which pass the Doorn and the Tanqua Rivers. Seeds were obtained from which plants were raised at Kirstenbosch, these showing no marked difference from those collected in the wild state, and being also annual in habit.

In 1941, a year of unusually good winter rains in the Western Cape Province, a journey was made through the northern part of this Karoo area in the Calvinia Division, and on this occasion vast numbers of the plants were seen, especially in the Vogelstruisvlakte and near De Bosch, where they formed extensive patches of bright yellow colour. Instead of being a rarity as I had supposed, therefore, *Euryops annuus* is locally a very abundant plant, though it probably only makes an appearance on the large scale in the occasional favourable seasons.

It is remarkable that this plant does not seem to have been previously collected, no specimens of it having been found in the herbaria examined. The explanation probably lies in the remoteness of its habitat which is of a generally unpropitious nature, served by bad roads, and the fact that it only flowers in mid-winter in the rare favourable years.

Heliophila lanceolata Adamson. (Cruciferae.)

Annua 10—20 cm. alta, glabra subflaccida, ramosa, ramis patulis ascendentibus. *Folia* integra, lanceolata, 1—2 cm. longa, 2—4 mm. lata, pallida, tenerrima. *Racemi* laxi pauciflori sed primo corymbosi. *Sepala* 2 mm. longa, subaequalia, pallide membranacea apice viridia. *Petala* alba, sepalis duplo longiora. *Stamina* edentata. *Siliqua* patens

vel tandem subdeflexa, 12—15 mm. longa, pedicello 8—12 mm. longo, complanata, moniliformis, in situ seminum 2 mm. lata, inter semina multo distantia 0·5 mm. lata et 1 mm. longa. *Valvulae* indistincte uninerviae. *Stylus* cylindricus, 1 mm. longus. *Semina* 4—6, ovato-rotunda.

Hab. A short lived annual. In damp places generally at the foot of wet rocks. Fl. Aug.—Sep. Cape Peninsula : Table Mt., southern slopes, *M. Walgate* ; Karbonkelberg, *Adamson* 2973 (type in Herb. Bol.) ; Noordhoek Mts., *M. Walgate* ; Glencairn, *Adamson* 1908.

Allied to *H. pusilla* L.f. but differing in leaf, larger flower, and the much more constricted fruit. A smaller plant than *H. pallida* Schltr. and with toothless stamens and different fruits.

Hermannia intricata Adamson. (Sterculiaceae.)

Suffrutex 15—20 cm. alta, ramosa, lignosa, ramis divaricatis intricatis. *Rami* foliaque pilis stellatis rudis obtecta. *Folia* parva, ovata, serrato-incisa, 8—9 mm. longa, 4—5 mm. lata, basi in petiolo 2—3 mm. longo cuneata, stipulis petiolum subaequantibus, acutis, basi latis cordatis. *Flores* binati, axilares, pendentes, pedunculo foliis longiore, bracteis stipuliformibus. *Sepala* ad medium connata lobis acuminatis rubropunctatis. *Petala* sepalis multo longiora, 4—5 mm. longa. *Filamenta* lata membranacea, apice vix angustata, minute hirsuta, antheris apiculatis hirsutis. *Ovarium* prismaticum dense pilosum stylo glabro. *Fructus* viridis, profunde quinquesulcatus, apice retusus, 6—7 mm. longus, 4—5 mm. latus.

Hab. Cape Peninsula : Dry slopes among bushes on Little Lion's Head, at 800—1,000 ft. Fl. Aug.—Sep.

Type. Salter (*Adamson* 1901) in Bolus Herb. First collected by *Pillans* (Bolus Herb.) ; *Adamson* 2618.

A low growing undershrub with woody zigzag stems. The younger parts roughly hairy. Leaves scattered with the veins prominent on the under side. Flowers small, lemon yellow. Sepals united for half their length. So far only discovered in one locality.

Hyacinthus paucifolius Barker. (Liliaceae—Scilleae.)

Bulbus globosus, diam. 1—1·5 cm. *Folia* 2, patentia, linearia, canaliculata, subacuta, long. 5—10 cm., lat. 3 mm. *Pedunculus* long. c. 3 cm. *Inflorescentia* racemosa, pauciflora ; pedicellus inferior long. ad 8 mm. ; *bracteae* minutae. *Perianthium* lilacinum, long. 12—15 mm. ; *tubum* long. 6—7 mm., diam. 2 mm. ; *segmenta* oblonga, subaequalia, long. 6—8 mm., lat. 2 mm. *Stamina* biseriata, tubo breviora ; *filamenta* long. 1 mm. *Ovarium* oblongum, diam. 1·5 mm. ; *stylus* long. 1 mm.

Hab. Cape Province : Malmesbury Div. ; Vredenburg, *J. W. Mathews.*

Nat. Bot. Gdns. Kirstenbosch 689/30 (*type* in Nat. Bot. Gdns. Herb.). Flowers May.

Description : *Bulb* globose 1—1·5 cm. diam. *Leaves* 2, spreading, linear, canaliculate, subacute, 5—10 cm. long, 3 mm. broad. *Peduncle* about 3 cm. long, the greater part of it underground. *Inflorescence* racemose, usually few flowered : lowest pedicel up to 8 mm. long ; bracts minute. *Perianth* 12—15 mm. long ; segments lilac, oblong, subequal, 6—8 mm. long and 2 mm. broad ; tube shading to white at base, 6—7 mm. long, 2 mm. diam. *Stamens* biseriate, shorter than the tube and included in it, filaments very short, 1 mm. long, the lowest ones adnate to the tube about halfway up. *Ovary* oblong 1·5 mm. diam. ; style short, 1 mm. long.

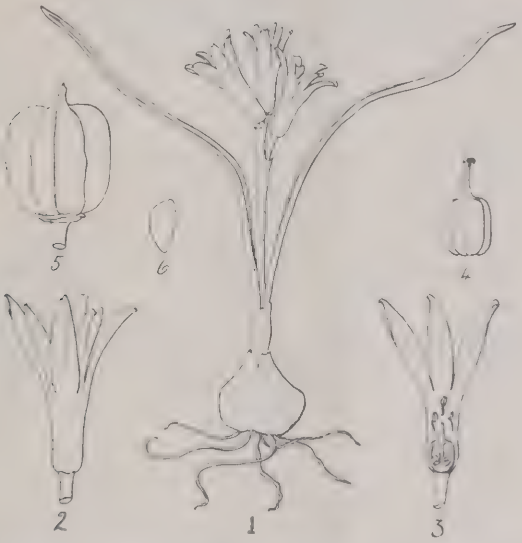

Fig. 5. ***Hyacinthus paucifolius*** **Barker. 1. Plant, nat. size. 2. Flower × 2. 3. Longitudinal section of flower × 2. 4. Gynaecium × 4. 5. Young capsule × 4. 6. Seed × 4. (*Mathews*, N.B.G. 689/30.) *Del.* W. F. Barker.**

Up to the present the genus Hyacinthus has been represented in South Africa by the two species *H. corymbosus* Linn. and *H. Gawleri* Baker. As far as is known the latter is not represented in Herbaria but is known only from the figure in Bot. Mag. t. 1468. When it is compared with specimens of *H. corymbosus* they appear to be very closely related, differing mainly in the inflorescence which is corymbose in the latter and racemose in *H. Gawleri*, but as there appear to be intermediates they may represent extreme forms of the same species. The new species collected by Mr. Mathews differs distinctly from both the previous species in several respects. The leaves are always two in number and not several; the perianth has a distinct tube as long as the segments; the filaments are very short and the stamens are included in the tube, while the style which is very short is also included in it and is shorter than the stamens.

Leucospermum album Bond. (Proteaceae.)

Frutex erectus, c. 2 m. altus. *Folia* sessilia, glabrescentia ovato-elliptica callis apicalibus 1—3, basibus subcordatis. *Capitula* 2—6 glomerata, breviter pedunculata. *Pedunculi* bracteati. *Bracteae involucrales* breves, ovatae, ciliatae. *Receptaculum* fere planum. *Perianthium* album, infra glabrum, supra villosum. *Antherae* sessiles. *Stylus* rectus, attenuatus, albus. *Stigma* conico-ovoideum.

A much branched erect shrub, up to 2 m. high, with smooth grey bark. *Branches* white pilose, glabrescent. *Leaves* subimbricate, erecto-patent, sessile, coriaceous, 3—3·5 cm. long, c. 1·5 cm. wide, ovate-elliptical, with 1—3 apical calluses, rounded or subcordate at base, inconspicuously clothed with soft hairs when young, glabrescent. *Flower-heads* about 2·5 cms. long and wide, in terminal clusters of 2—6, shortly peduncled among the upper leaves; scented, white, with short red, ovate, ciliated involucral bracts. *Peduncles* up to 12 mm. long, slender with imbricating, subacute, villous bracts. *Receptacle* almost flat. *Floral bracts* c. 5 mm. long, lanceolate acuminate, outer surface densely villous, glabrous within; adult *flower buds* c. 12 mm. long; *perianth tube* c. 4 mm. long, glabrous below, villous above; *adaxial and lateral claws* united into a straight slender sheath, at length splitting near the apex; *abaxial claw* free, c. 6 mm. long, *limbs* c. 2 mm. long, deflexed lanceolate, subacute; *anthers* c. 1 mm. long, sessile, elliptic; *hypogynous scales* 4, c. 1·3 mm. long; *ovary* c. 2 mm. long, passing gradually into the style; *style* c. 14 mm. long, white, straight, slender, glabrous; *stigma* c. 1 mm. long, conic-ovoid. *Fruit* c. 9 mm. long, 4 mm. wide, glabrous except for basal tuft of hairs.

Hab. Cape Province. Stellenbosch Division: Gordon's Bay, *Mathews* N.B.G. 1327/29 (Type in National Botanic Gardens Herbarium); *H. Bolus* 8077; *Lavis* in Herb. Bolus 18536; Steenbras, *Middlemost* 56 (N.B.G. 2012/26); Steenbras Dam, *Middlemost* N.B.G. 2010/26; without locality, *Guthrie* 176.

This species occurs abundantly in a limited area on the seaward slopes of the Hottentots Holland Mountains behind Gordon's Bay and Steenbras

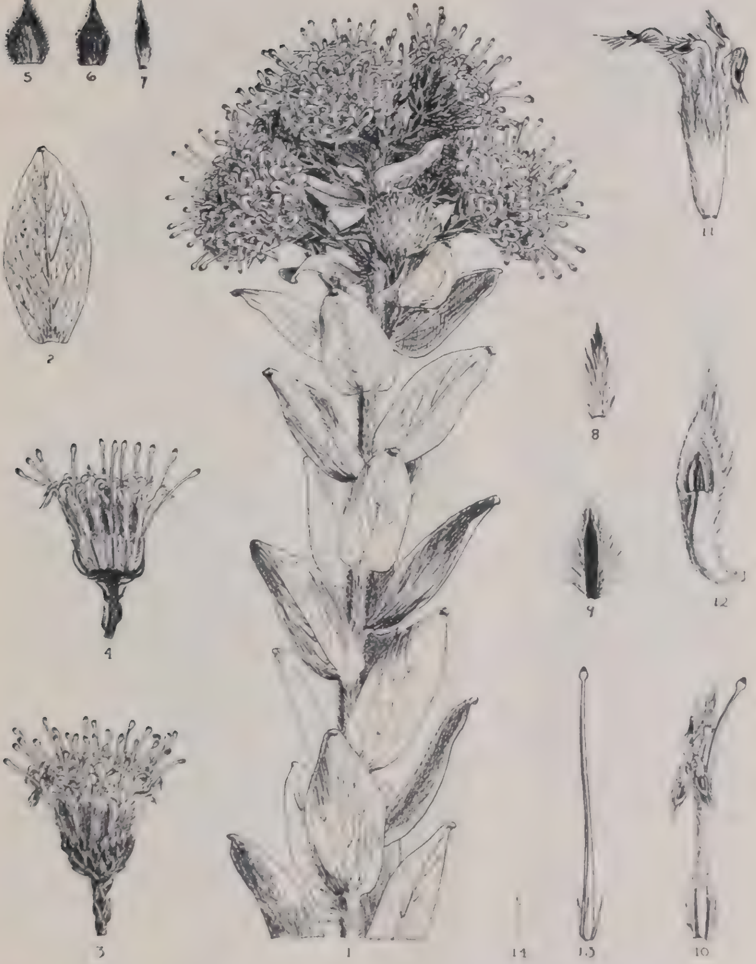

FIG. 7. *Leucospermum album.* 1. Portion of plant, nat. size. 2. Leaf × 2. 3. Inflorescence, nat. size. 4. Long. sect. of inflorescence, nat. size. 5. Outer involucral bract × 2. 6. Middle involucral bract × 2. 7. Inner involucral bract × 2. 8. Outer surface of floral bract × 2. 9. Inner surface of floral bract × 2. 10. Floret and bract × 2. 11. Perianth spread out × 2. 12. Stamen and perianth segment × 8. 13. Gynaecium × 2. 14. Hypogynous scale × 2. (*Mathews,* N.B.G. 1327/29.) *Del.* M. Walgate.

River Mouth. It has been grown for many years in the National Botanic Gardens, Kirstenbosch.

Its affinities are with *L. puberum* and *L. buxifolium*. From the former it differs in its larger size, larger leaves and peduncled flower heads; from the latter in its larger and broader leaves.

This is the only species of Lencospermum with white flower heads, and the sweet scent is unusual although not unique in the genus.

Lightfootia tenuis Adamson. (Campanulaceae.)

Caules tenues procumbentes ramosi basi sublignosi. *Folia* opposita vel superiora alterna, linearia, falcata, superne minute canaliculata, marginibus remote dentatis, internodiis breviora, folia infima saepius fasciculis foliorum minorum axillaribus. *Flores* solitarii, pedunculis tenuibus foliis multo longioribus, apice hirsutis. *Sepala* angusta petalis multo breviora. *Petala* basi in tubo lobis triplo breviore connata, tubo lobis calycinis dimidio breviore. *Ovarium* hemisphaericum pilis albis appressis dense hirsutum. *Stylus* superne incrassatus petalis aequilongus.

Hab. Cape Peninsula. Sandy and peaty soils where damp. Valley in hills between Glencairn and Simonstown. Fl. Mar.—Apr. especially after fire. *Adamson* 1684 (type in Bolus Herb.), 2336, 2432; *Salter* 5704; *Levyns* 5326, 5615.

Allied to *L. oppositifolia* A. DC. but much more slender with linear curved leaves shorter than the internodes except at the base, hairy ovary, and corolla with tube shorter than the calyx lobes. The plants agree with the description of *L. rubioides* A. DC. but do not agree with the type specimen of that species in the Banks herbarium in the British Museum with which they have been compared by C. Norman.

Stems wiry reddish, the younger parts with short hairs. *Leaves* glabrous with a few blunt teeth on the edges. *Calyx lobes* 2 mm. long. *Corolla* 4—5 fid, white, fading to yellow, purple externally, 2—3 times as long as the calyx, with a tube half as long as the calyx lobes. *Style* as long as the corolla gradually thickened upwards. *Stigma* 3-fid. *Ovary* covered with white appressed hairs except for three green veins which are not symmetrically placed. In dried specimens the hairs often break off leaving only a very short basal portion.

Limonium penicillatum Adamson. (Plumbaginaceae.)

Perennis, laxe subcaespitosa, scaposa. *Rhizoma* lignosum, ramosum, erectum vel suberectum. *Folia* omnia radicalia, erecta, integra, nervosa, apice obtusa vel mucronata, margine plana vel paulo recurvata, petiolata, 3 cm. longa, 1 cm. lata. *Scapus* 12—25 cm. altus, densissime glanduloso-tuberculatus, infra medium ramosus, ramis pernumerosis ascendentibus saepius plus minusve unilateralibus, densissime corymbosis, ultimis

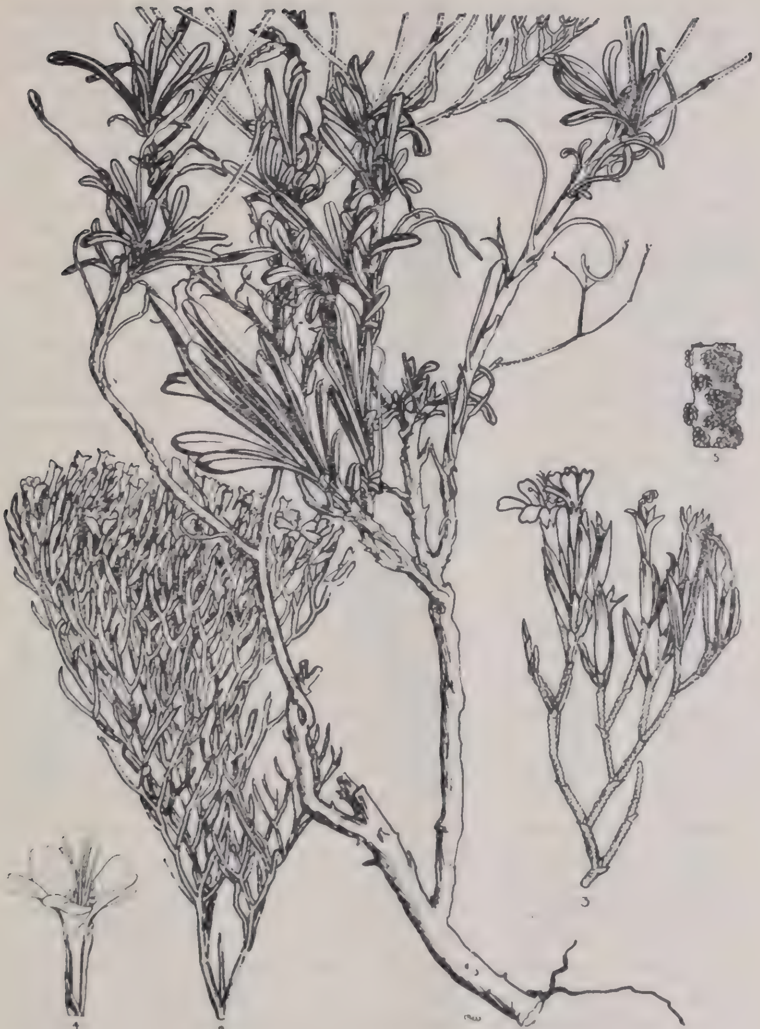

FIG. 8. *Limonium penicillatum.* 1. Lower part of plant, nat. size. 2. Part of inflorescence, nat. size. 3. Inflorescence branches with spikelets × 2. 4. Flower × 3. 5. Small part of inflorescence axis × 20. (*Salter*, Witsands.) *Del.* M. Walgate.

tenuibus, inferioribus sterilibus. *Spiculae* uniflorae. *Bractea* exterior firma, media duplo longior scariosa, interior quam media duplo vel triplo longior viridis acuta, margine pallida scariosa. *Sepala* glabra lobis brevibus subobtusis, petalis breviora. *Stamina* exserta. *Styli* liberi.

Hab. South-west Cape : On rocks or sand near the sea. Cape Div. : Sea Point, *C. Norman* 277 ; Chapman's Peak, *Adamson* 859 (type in Bolus Herb.), 894, 1598 ; Muizenberg, *Maude* 58 (as *L. scabrum*) ; Kalk Bay, *Bolus* 3374 ; Glencairn, *L. Bolus* (as *L. scabrum*) ; Simonstown, *Salter* 298 17 (as *L. equisetinum*), *Adamson* 1592 ; Witsands, *Salter* (Adamson 2796) ; Vasco da Gama Peak, *Pillans* 8555 (as *L. scabrum*) : Cape of Good Hope, *Adamson* 509. Caledon Div. : Hermanus, *Burtt-Davy* 18455 (as *L. scabrum*).

Allied to *L. scabrum* and frequently placed under that species in collections. It is distinguished most readily by the dense brush-like flat-topped inflorescence with thin branches. All parts of the inflorescence axis are densely covered by glandular tubercles. The rhizome is longer and more branched than in *L. scabrum*, the leaves thinner and most often persisting at the flowering period. The spikelets are always one-flowered with no trace of a second flower. The bracts are more acute and have a narrower and pale coloured margin. The species does not occur away from the coasts. Fl. Dec.—Mar.

Myrsine Pillansii Adamson. (Myrsinaceae.)

Frutex 2—3 m. alta, ramosa, ramis glabris ascendentibus. *Folia* rhomboidea vel ovato-rhomboidea, petiolata, basi cuneata, apice acuta, minute crenato-serrata, glabra, superne nitida inferne pallida, 3—5 cm. longa, 1—2 cm. lata. *Flores* axillares, 1—3, subsessiles. *Sepala* obtusa, 1 mm. longa, minute ciliata. *Petala* 2—4 mm. longa, acuta, externe hirsuta. *Stamina* petalis breviora, straminea. *Ovarium* rotundatum apice depresso. *Stylus* 2—3 mm. longus stigmate capitato. In floribus masculis ovarium abortivum minutum adest.

Hab. South-west Cape : Sheltered bushy slopes, 800—1000 ft. Rare. Cape Peninsula : Kirstenbosch on S. side of ridge to Wynberg Hill, *Pillans* 4782 (type in Bolus Herb.), Bolus Herb. 17743. Ravine on E. side of Devil's Peak, *Zeyher*. Stellenbosch : Ida's Valley, *U. Malleson* (Bolus Herb. 17679).

A distinct species with scattered rhombic leaves with a few indistinct teeth in the distal half. Young twigs with glandular dots, the older smooth. Flowers in small separated groups on stalks 1—2 mm. long. Zeyher's specimen which is the earliest collecting is without flowers. The species is named in honour of its rediscoverer, N. S. Pillans. Fl. Aug.—Sep.

Thesium oresigenum Compton. (Santalaceae.)

Fruticulus glaber, foliosus. *Folia* linearia, subteretia, integra, apiculata. *Flores* in glomerulis axillaribus. *Bracteae* bracteolaeque foliaceae. *Perianthii segmenta* deltoidea, nuda, breviter cucullata. *Antherae* pilis ad perianthium adhaerentes. *Stylus* mediocris. *Stigma* obtuse sublobatum. *Fructus* globosus.

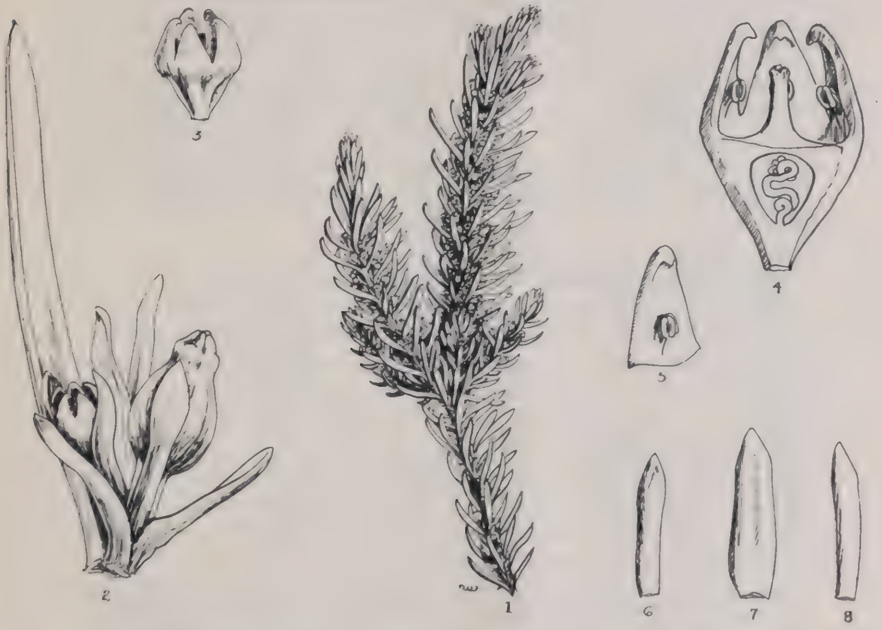

Fig. 9. *Thesium oresigenum.* 1. Portion of plant, nat. size. 2. Inflorescence in axil of leaf × 8. 3. Flower × 8. 4. Longitudinal section of flower × 20. 5. Stamen on perianth segment × 20. 6, 7, 8. Floral bracts × 8. (*Compton* 9774.) *Del.* M. Walgate.

Hab. Cape Province. Worcester Division; Audensberg, near summit, 1800 met., *Compton* 9774, 6 October 1940, (type in National Botanic Gardens Herbarium); same locality and date, *Esterhuysen* 3314. Ceres Division; Elands Kloof, *Esterhuysen* 3312. Piquetberg Division; Great Winterhoek Peak, near summit, 2100 met., *Compton* 4631, 14 February 1934. Clanwilliam Division; Zuurvleiberg, near summit, 1700 met., *Esterhuysen* 2553, March 1940.

Description. A small densely leafy glabrous subglaucous shrub with

numerous erecto-patent branches on which the old leaf-bases are prominent. *Leaves* patent or erecto-patent, slightly inflexed, linear, subterete, slightly flattened above, subsucculent, 8—12 mm. long, 0·8—1·0 mm. wide, the margins entire, the vein not prominent, the tip dark-apiculate. *Flowers* numerous in axillary bracteate clusters shorter than the subtending leaves. *Bracts* and bracteoles leaflike, subsucculent, the latter 2·0—2·5 mm. long. *Pedicel* short, lengthening a little in fruit. *Perianth* segments deltoid, 0·9 mm. long, without fringe, beard or papillae, shortly and acutely cucullate. *Disc* 1·0 mm. in diameter. *Anthers* 0·25 mm. long, attached to the perianth by a few hairs which are inserted near the base of the filament and are parallel with it. *Style* 0·5 mm. long. *Stigma* not broader than the style, obtusely sublobate. *Fruit* spherical, lightly wrinkled, 1·5 mm. in diameter.

An inconspicuous but distinctive species, so far only found sparsely among rocks near the summits of high mountains of the Western Cape Province.

Thoracosperma Bondiae Compton. (Ericaceae-Ericoideae.)

Frutex erectus, ramosus. *Folia* 3-nata, erecta, angusta, sulcata, obtusa, glabra, long. 2—3 mm., lat. 0·5 mm. *Flores* 3—5-nata, axillares vel terminales, erecti vel cernui. *Pedicellus* long. 1 mm., minute puberulus. *Bracteae* 3, approximatae, coloratae, ciliolatae, long. 0·7 mm. *Sepala* ovata, colorata, apice sulcata, ciliolata, long. 1·2 mm. *Corolla* rosea, glabra, ovoideo-urceolata, long. 3·5—4·0 mm., segmentis suberectis, long. 0·5 mm. *Antherae* exsertae, fuscae, scabridae, oblongae, bifidae, aristis parvis, scabridis, divergentibus, breviter ad filamentum adnatis. *Ovarium* glabrum, loculis 4, uniovulatis, disco prominente, stylo angusto, longe exserto, stigmate minuto.

Hab. Cape Province. Oudtshoorn Division: Roodeberg, 1000 met., 24 March 1940. *Bond* 235 (type in National Botanic Gardens Herbarium).

Description. A small erect shrub with numerous slender flexuous branches. *Stems* densely minutely puberulous. *Leaves* 3-nate, the petioles short and gibbous at the base, the lamina erect or appressed, narrow-oblong, flat above, convex and narrowly sulcate below, obtuse, glabrous, 2—3 mm. long, 0·5 mm. wide. *Flowers* numerous in small axillary or terminal clusters of 3—5, erect or cernuous. *Pedicel* minutely puberulous, 1 mm. long. *Bracts* 3, closely approximate, subequal, convex, obtuse, coloured, ciliolate, 0·7 mm. long. *Sepals* ovate, coloured, sulcate at the apex, obtuse, ciliolate, 1·2 mm. long. *Corolla* rosy, glabrous, ovoid-urceolate, 3·5—4·0 mm. long, the segments short, obtuse, erect or slightly spreading, 0·5 mm. long. *Filaments* slender, 4 mm. long. *Anthers* exserted, 1·5 mm. long, scabrid, dark-coloured, oblong, slightly curved, bifid, the loculi parallel, the pores small, with two small dark, scabrid, diverging spurs which are shortly adnate to the filament. *Ovary* glabrous, 4-locular, each loculus with a single ovule, the disc prominent, the style 6—7 mm. long, slender, far-exserted, often curved, with a minute stigma.

This new Thoracosperma has the largest flowers of any species so far described. Its nearest affinity is perhaps with *T. rosaceum* L. Guthrie from Muiskraal, but it differs therefrom in its larger corolla, anthers and style, its adnate anther-spurs and its glabrous ovary. From *T. Marlothii* N. E. Brown it also differs in its larger corolla, anthers and style.

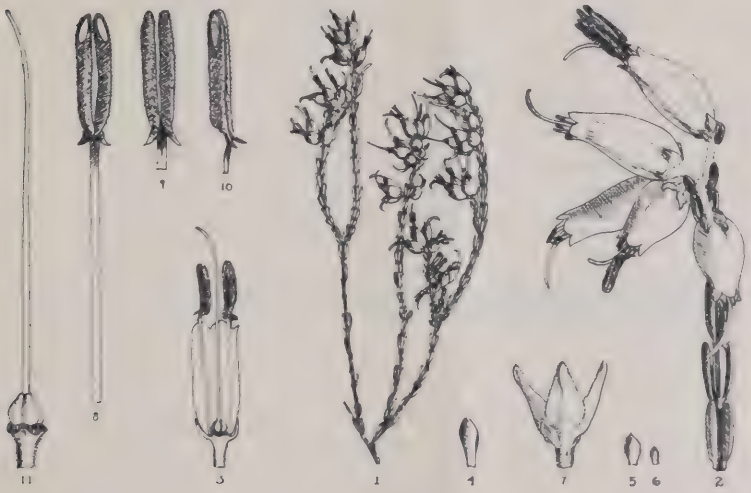

FIG. 10. *Thoracosperma Bondiae.* 1. Portion of plant, nat. size. 2. Inflorescence and leaves × 5. 3. L. S. flower × 5. 4, 5, 6. Bracts × 10. 7. Calyx and bract × 10. 8, 9. Stamens × 10. 11. Gynaecium × 10. (*Bond* 235.) *Del.* M. Walgate.

Zygophyllum procumbens Adamson. (Zygophyllaceae.)

Caules prostrati vel procumbentes, basi solum lignosi, espinosi. *Folia* sessilia, foliola subcarnosa, juvenilia subteretia infra canaliculata, vetera subplana, 1—2 mm. lata, 1—1·5 cm. longa. *Flores* nutantes pedicellis folia aequantibus vel paulo superantibus. *Sepala* submembranacea, obtusa. *Ligulae* staminum filamentis duplo breviores, in apice at lateribus lacerato-serratae. *Fructus* sphaericus, 5—8 mm. diam., viridis, subsucculentus.

Hab. Sand or gravel under bushes at low altitudes. Fl. July—Aug. Cape Peninsula: Muizenberg, *M. M. Page*; Kalk Bay Mts., *Adamson*

2879; Fish Hoek, *Guthrie* 550; Red Hill, *Adamson* 1929; Smitswinkel Bay, *Guthrie*; *E. P. Phillips* 26051; Bonteberg, *Adamson* 1813; Vasco da Gama Peak, *Salter* 8190; *Adamson* 2889 (type in Herb. Bol.), 2887; Cape Maclear, *Salter* 7430B; *G. J. Lewis*; *Adamson* 1917.

Allied to and hitherto not separated from *Z. spinosum* L. but distinguished from that species by the habit, spineless stems from a woody base, smaller flowers and fruits and especially by the quite different staminal scales.

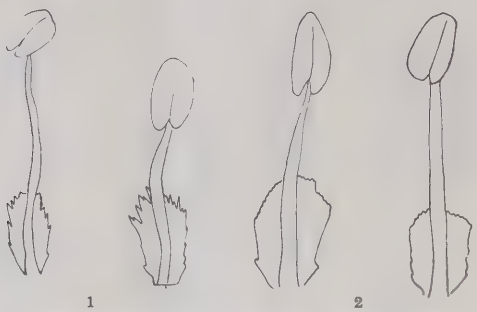

FIG. 11. 1. *Zygophyllum procumbens*, stamens × 5. (*Adamson* 2889.) 2. *Z. spinosum*, stamens × 5. (*Adamson* 3904.) *Del.* M. Walgate.

DESMONEMA FRAGOSUM FROM THE NORTHERN TRANSVAAL.

By I. C. Verdoorn.

Desmonema fragosum Verdoorn sp. nov. ramis lateralibus valde abbreviatis tumidisque, pseudoracemis 2—4 cm. longis, foliis cordatis petiolis 2—7 cm. longis, staminis 6 basi connatis distinguitur.

Caules scandentes, sub-succulentes, fragosi, 0·5—3 cm. diam. glabri. *Rami* laterales valde abbreviati, tumidi, cicatricosi, ramulis ultimis decidius. *Folia* hysterantha ; petiolus 2—7 cm. longus, glaber ; lamina firme herbacea, orbiculare-ovata base profunde cordata, 3—8 cm. longa, 3—8 cm. lata, glaber. *Pseudoracemi* 2—4 cm. longi ; bracteae 1—3 mm. longae. *Flores* dioici ; ♂ sepala 6 lata ovata 3 exteriora 1·5 mm. longa 1 mm. lata, 3 interiora 3·5 mm. longa 2·5 mm. lata ; petala 6 obovata 2 mm. longa 1·5 mm. lata, saepe obscure et irregulariter subcrenata ; stamina 6 basi solum connata, 2·5 mm. longa ; filamenta 1·5 mm. longa ; antherae rima longitudinali lateraliter dehiscentes ; ♀ sepala 6, 3 exteriora 2 mm. longa, 1·25 mm. lata, 3 interiora concava 4 mm. long, 3 mm. lata ; petala 6 obovata 2 mm. longa 1·5 mm. lata ; staminodia 6 petalas opposita, 2 mm. longa ; carpella 3, breve stipitata ; ovarium basi stipitatum, articulatum, oblique ovoideum ; stigma subsessile terminale. *Drupae* coccineae, inaequilateraliter ovoideae, 10 mm. longae 7 mm. diam. ; exocarpium pulposum ; endocarpium cartilagineum dorso convexum, costatum, verrucosum, ventre sub-planum concavum ; condylium sub-globosum ; albumen ruminata.

Hab. Transvaal ; Zoutpansberg Dist. on slopes western extremity of Zoutpansberg range *Obermeyer*, *Schweickerdt* and *Verdoorn* 136 ; Waterpoort *v.d. Merwe* 1452 (type ♂) Wylies Poort *v.d. Merwe* 2185 (type ♀) 2185.A (immature fruit) 2185.B (fruit and leaves) and 2151 (leaves only) ; Dongola Botanic Reserve near Messina *Pole Evans* 4552. Lydenburg Dist. Lulu Mts., Farm Avontuur, *Barnard* 58.

In 1910 a comprehensive monograph of the family *Menispermaceae* by L. Diels was published in Pflamzenreich Vol. IV. 94. Possibly owing to the plants being dioecious and the amount of variation of several of the characters of this family the genera are not very clearly defined, with the result that it has been a problem to decide into which genus to place this plant. It falls in the tribe *Tinosporeae*, the seed being albuminous.

the endocarp verrucose and a condylus (knuckle-like intrusion on the ventral surface of the seed) present. In this tribe the genera *Tinospora* and *Desmonema* are closely related. They are distinguished in the key as follows :—

Stamens 6, free, rarely somewhat connate at the base	*Tinospora.*
*Stamens 6, connate	*Desmonema.*

In our specimens the stamens are connate at the base only, coming out as a cluster when the flower is dissected. On this character it might go into either genus for some species of *Desmonema* are said to be connate at the base only. Taking the characters point for point in the two generic descriptions our plant would appear to agree more closely with *Tinospora.* On the other hand, the petals and stamens in *Tinospora* are described as being adnate to the gynoecium, whereas they are not so in our plant, and all but one of the species of *Tinospora* are extra-African. The one African species comes from Senegambia and is not at all like our plant according to its description. Diels writes, too, that *Desmonema* is very close to *Tinospora* and takes the place of that genus in Africa south of the Sudans. Further, he transfers three species originally described from these southern regions under *Tinospora* to *Desmonema*. On these grounds I am placing the plant under discussion in the genus *Desmonema*, giving as complete a description as possible, that is, not taking generic characters for granted. This species seems to have no very near affinity with any of the species so far described in either of the abovementioned genera. From *Desmonema caffra*, which occurs in Natal and is so far the only one described from South Africa, it differs principally in the thick stems, hysteranthous leaves, short racemes and the stamens being 6, not 3, in number.

A remarkable characteristic of *Desmonema fragosum* is its tendency to break and subsequently to send out string-like roots which grow towards the ground, sometimes from a height of 12 feet. This character is mentioned as occurring quite frequently in the tribe *Tinosporeae*. The lateral branches are much abbreviated and swollen and bear the transverse scars of the early deciduous racemes and leafy shoots. The flowers appear in spring in pseudo-racemes up to 4 cm. long. All the other described species have the inflorescence much longer, about 10—30 cm. long. The numerous small drupes about 10 mm. long and 7 mm. diameter are very decorative, ripening to a bright orange red just when the clear apple-green leaves appear. These leaves are deeply cordate and are borne on petioles about as long as or longer than the blade and of the same green colour.

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* As a matter of interest it may be mentioned that the stamens in *Desmonema* may be 6 or 3. Diels mentions this in his description of the genus, but has left it out in the key quoted above.

When planting sticks of this climber it was puzzling to know the top from the bottom. Three opinions found it difficult to agree. It seemed feasible to assume that the abbreviated branches curved upwards. This was accepted and the slips were planted accordingly. Two grew normally in this way, but the third, after a period of dormancy, put out its string-like roots from the top, and when these had reached the ground there seemed to be a deadlock, the growing point being firmed embedded in the soil !

About the distribution of this species, Dr. F. Z. v.d. Merwe, who has observed it for some years, writes : " I have seen it all along the northern slopes of the Zoutpansberg from east to west and on koppies between the Zoutpansberg range and the Limpopo river. Also along the Olifants river (Pietersburg district) east of Malipsdrift associated with large trees round which it winds and over which it sprawls, usually, but not always, in rocky localities."

Mr. W. G. Barnard of Sekukuniland, Lydenburg district, collected it on the Lulu mountains and has supplied to the National Herbarium the following interesting notes on its uses by the natives, who call it " Penyaleng " - " Used as a Turkish or mustard bath. Patient to drink one pint of bath water whilst bathing—for rheumatics and other bodily pains. Very bitter. Where there is no bath available water is boiled in pots and the stem and leaves placed therein. The patient is covered with a blanket or hide and the steaming pot placed with him. Hot flint stones are thrown into the pot to make steam. This is continued for an hour, daily, for several days."

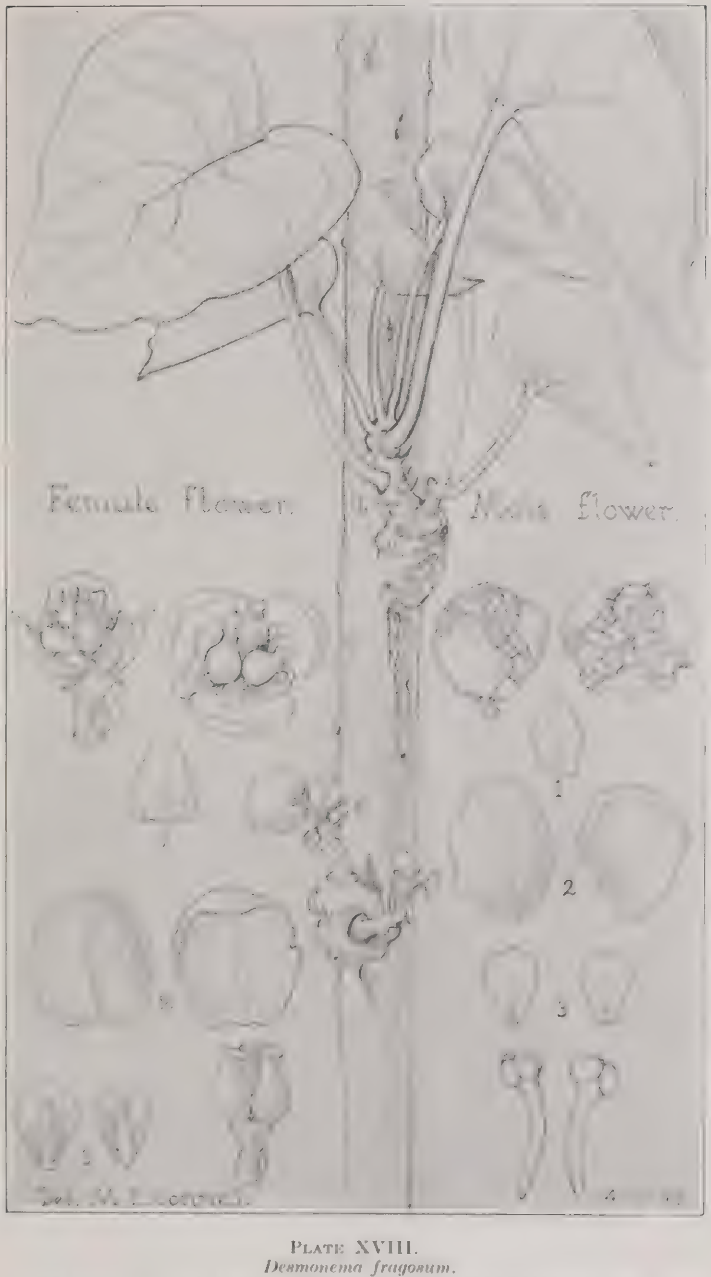

Plate XVIII.
Desmonema fragosum.
1, Outer sepals. 2, Inner sepals. 3, Female, petals with staminodes; male, petals.

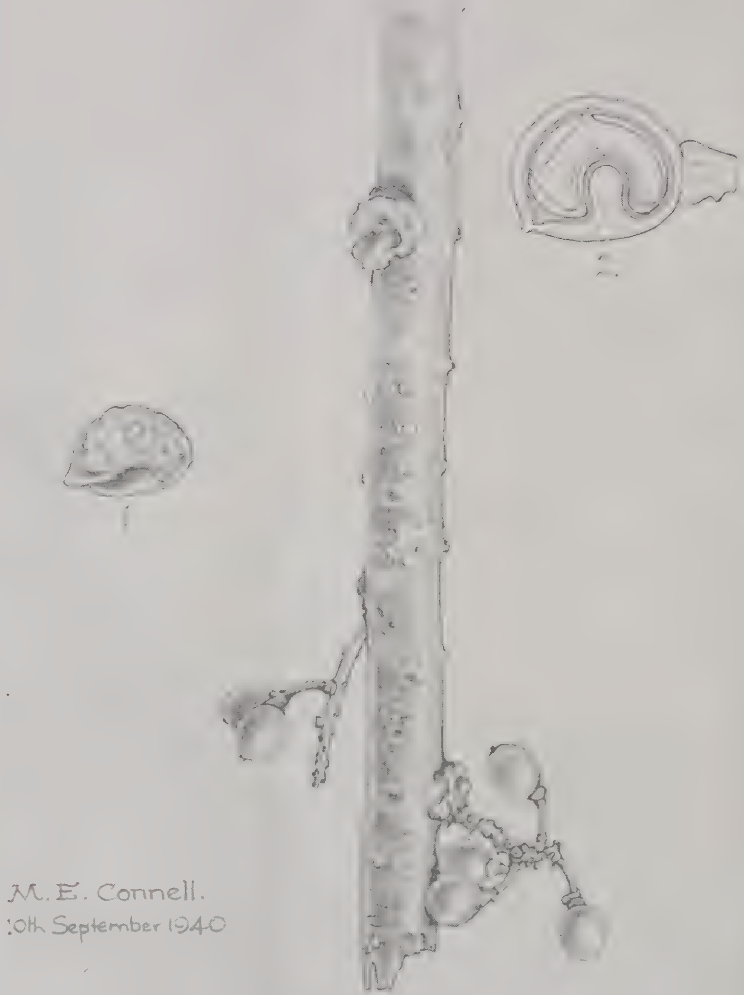

PLATE XIX. *Desmonema fragosum. Immature fruiting specimen. (Fruit green.)*
1. Seed showing cavity on under surface, ridge over back and verrucose surface.
2. Longitudinal section of fruit showing the shape of the condylus and the runcinate albumen.

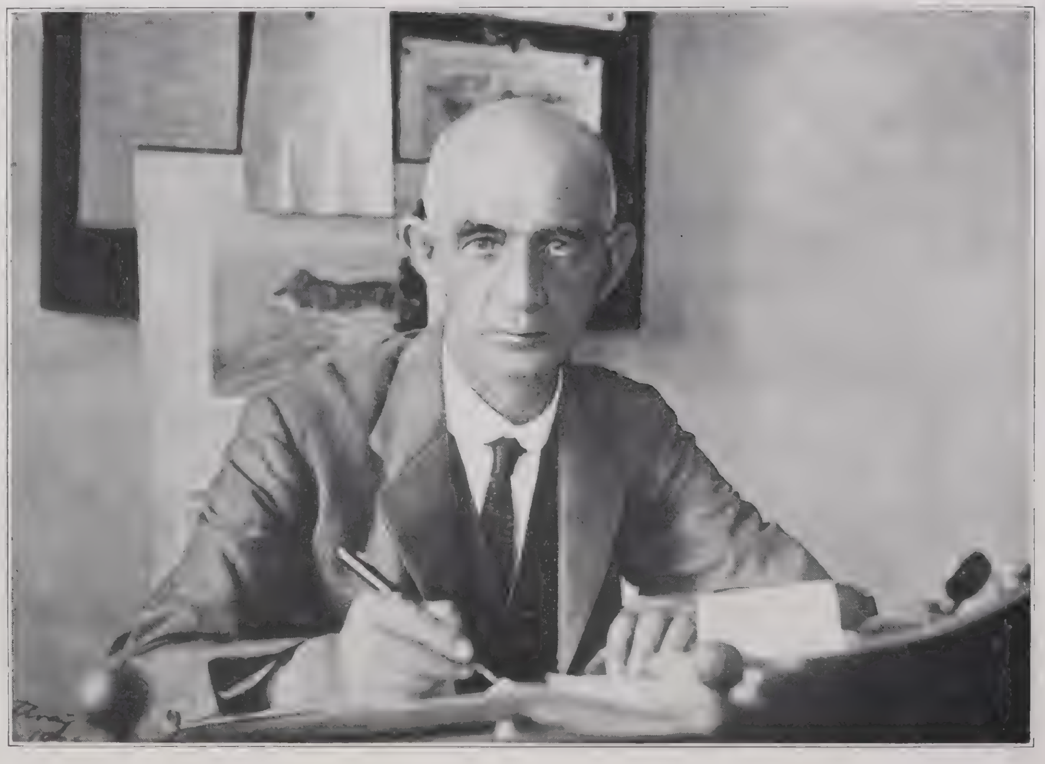

Plate XX. George Rattray.

OBITUARY.

GEORGE RATTRAY.

1872-1941.

It is with regret that we announce the death of Dr. G. Rattray, M.A., D.Sc., which took place on the 13th May, 1941.

George Rattray was born in Aberdeenshire in 1872 and was educated at the Tough Public School, Old Aberdeen, and King's College, Aberdeen, graduating M.A. in 1894. Entering the teaching profession, he taught for a while at Annan Academy, Dumfries, and then came to South Africa, where he was for three years on the staff of the Graaff-Reinet High School. He then returned to Scotland and took his B.Sc. degree at his old university of Aberdeen, obtaining special distinction in botany and zoology. In 1903 he came back to South Africa, teaching for a year at the Boys' High School, Wellington.

In 1904 he was appointed principal of Selborne College, East London, a post which he held for 27 years. In the midst of his multifarious duties as head of this important school for boys he found time to pursue his studies in botany and zoology. He carried out research work in connection with the Cycads, visiting during his holidays many parts of South Africa to examine the various species. For his thesis on the Cycadaceae of South Africa, the University of Aberdeen in 1910 conferred on him the degree of Doctor of Science. He collaborated with Dr. J. Hutchinson in the account of the South African Cycads published in the Flora Capensis in 1933.

Dr. Rattray took a keen interest in all local affairs and had for many years been a valued member of the East London Public Library Committee and Museum Board.

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